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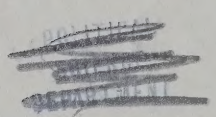

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C. 4. M. 4. 1924. III.
C. H. 147.

GENEVA,
January 3rd, 1924.

LEAGUE OF NATIONS.

HEALTH ORGANISATION.

REPORT

OF THE

Technical Conference for Consideration of Certain Methods of Biological Standardisation.

Edinburgh, July 19th-21st, 1923.

The Conference, summoned by the League of Nations Health Committee, was held in Edinburgh from July 19th to July 21st, 1923, at the offices of the Scottish Board of Health.

Dr. MADSEN (Chairman of the Health Committee of the League of Nations) presided over the Conference, which was attended by the following distinguished representatives of Pharmacology in different countries:

Professors ABEL (Baltimore),
CUSHNY (Edinburgh),
DIXON (Cambridge),
HEYMANS (Ghent),
KROGH (Copenhagen),
MACLEOD (Toronto),
MAGNUS (Utrecht),
H. H. MEYER (Vienna),
ROST (Berlin),
STRAUB (Munich),
TIFFENEAU (Paris).

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Professor Reid Hunt (Boston) had been invited, but was unable to reach Great Britain in time for the Conference.

Dr. H. H. Dale (London) acted as Secretary-General to the Conference, and Professor von Knaffl-Lenz (Vienna) as Secretary.

The opening and closing meetings were also attended by members of the staff of the Scottish Board of Health (Dr. Ewan Macpherson and Sir Leslie Mackenzie) and of the Ministry of Health for England (Sir George Buchanan). The Under-Secretary of State for Scotland (Capt. Walter Elliot) also attended the closing meeting.

Dr. Madsen explained to the members of the Conference the nature of the problems which they had met to discuss, and emphasised the desirability of obtaining not only standard methods of testing, but stable standards of reference, for the important animal extracts and drugs needing control by biological methods. Dr. Madsen stated that the decisions of the Conference would be referred by him to the Health Committee of the League of Nations, and stated that this Committee had authorised him, as its Chairman, to nominate a small permanent Standards Committee to deal with questions concerning the standardisation of sera and biological products, and any others which might be referred to it by the Health Committee.

For the technical meetings of the Conference, Professor Cushny, on Dr. Madsen's proposal, acted as Chairman.

The following remedies were discussed by the Conference with reference to the possibility, in each case, of the international acceptance of a standard of activity, and of international agreement concerning the methods of the application of such standards.

1. *Filix mas.*

Discussion introduced by Professor Straub.

Professor Straub recommended the standardisation of the extract of *Filix mas* by the lethal effect on earth-worms

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(*Lumbricus terrestris*, or *Allolobophora foetida*). The following were suggested as the pharmacopœial direction for the test:

(1) *Extractum Filicis maris aethereum.* Earth-worms of medium size should be just killed when immersed in 100 cc. of a 0.002 % watery solution of the extract.

(2) *Rhizoma Filicis maris.* 0.002 % solution in water of the ether extract of the dried drug should just kill earth-worms of medium size immersed therein.

The Conference unanimously adopted these recommendations, as embodying the simplest and best method available, and of sufficient accuracy for the purpose.

The possibility of modifying the method to make it suitable for standardisation of the oil of Chenopodium was favourably considered.

2. *Thyroid gland.*

Discussion introduced by Dr. Dale (in the absence of Professor Reid Hunt).

The Conference unanimously agreed that it was desirable to organise comparative tests of the activity of thyroid preparations, as determined by the different available biological tests (Hunt's acetonitrile method, effects on amphibian metamorphosis, etc.), by determination of the organic iodine, and by clinical observation on thyroidectomised patients.

3. *Cannabis Indica.*

Discussion introduced by Professor Dixon.

The Conference agreed that, as Cannabis Indica was now little used and was not included in many pharmacopœias, it was not a suitable subject for an international recommendation.

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4. *Ergot.*

Discussion introduced by Professor TIFFENEAU.

The Conference unanimously passed the following recommendation:

"The Conference recommends that pharmacopœial preparations of ergot should be so made as to contain, as completely as possible, the specific alkaloids (ergotoxine, ergotamine) present in the original drug; further, that investigations should be continued with a view to agreement on an appropriate biological method for the assay of ergot preparations for these specific alkaloids."

5. *Pituitary (Posterior Lobe) Extract.*

Discussion introduced by Professor VOEGTLIN.

The Conference unanimously passed the following recommendation:

"The Conference recommends the adoption, as the international standard of activity for pituitary extract, of the acetone-extracted dry powder, as prepared from fresh infundibular substance in the Pharmacological Department of the Hygienic Laboratory of the United States of America. The Conference recommends that the method of quantitative comparison with this standard shall be the test on the isolated uterus. It further recommends that the official strength of the Pituitary Extract in the different pharmacopœias shall correspond to that of a 1 per cent. extract of the standard dry powder.

"It further recommends that, in addition to the assay by the uterus, a second qualitative, or less rigidly quantitative, test shall be applied, which shall be either a test of the action on the blood-pressure, or of the effect on diuresis; the exact nature of this second alternative test to be the subject of further investigation by members of the Conference, with a view to later decision."

6. *Digitalis, Scilla, Strophanthus and the other heart tonics.*

Discussion introduced by Professor Cushny and Professor Magnus.

The Conference unanimously passed the following recommendation:

"The Conference holds the opinion that the activity of digitalis, strophanthus, scilla and apocynum, and of other heart-tonics of this group and of their preparations, can be determined with reasonable accuracy, either by the lethal dose method on frogs, with injection into the lymph-sac, or by the lethal dose method on the cat, with slow intravenous infusion. The Members of the Conference have not sufficient evidence before them with regard to the relation between the activities determined for the same preparation by the two methods, or as to the relation between the activity determined by either method and the potency of the preparation as a therapeutic agent in human medicine. The Conference accordingly holds the opinion that for the present the choice of method should be determined by the experience of the individual worker, or by the variation of local conditions. It considers, however, that further investigation should be promoted, with a view to determining the relation between values obtained by the two methods, and of both to therapeutic activity.

"The Conference recommends the establishment of a unit of activity, for each of the remedies of this class, as highly desirable. In view of the multiplicity of methods and the possible variation of the experimental animals, it regards it as desirable that the unit should be defined in terms of a definite weight of some standard preparation, and not in terms of lethal effect upon a species of animal. It recommends the investigation of the possibility of using, as a standard for digitalis, a specially prepared sample of dried digitalis leaves, preserved with precautions against access of moisture or oxygen, and accepts the offer of Professor Magnus to prepare

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SOCIÉTÉ DES NATIONS.

Organisation d'Hygiène.

INVESTIGATIONS

sur le

SÉRODIAGNOSTIC DE LA SYPHILIS

RAPPORT DE LA CONFÉRENCE TECHNIQUE DE LABORATOIRE

(tenue à Copenhague, 19 novembre - 3 décembre 1923)

et deux Annexes.

LEAGUE OF NATIONS.

Health Organisation.

INVESTIGATIONS

on the

SERODIAGNOSIS OF SYPHILIS

REPORT OF THE TECHNICAL LABORATORY CONFERENCE

(Held at Copenhagen, November 19th to December 3rd, 1923)

(with two Annexes).

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SOCIÉTÉ DES NATIONS.

RAPPORT DE LA CONFÉRENCE TECHNIQUE DE LABORATOIRE.

Conformément aux décisions de la deuxième Conférence internationale pour la standardisation des sérums et des réactions sérologiques, convoquée par le Comité d'hygiène de la Société des Nations et réunie à l'Institut Pasteur de Paris du 20 au 26 novembre 1922, une étude comparative des différentes séro-réactions de la syphilis[1] fut entreprise dans les laboratoires suivants:

Autriche:	Professeur MÜLLER, Chef du Laboratoire sérodiagnostique, Allgemeines Krankenhaus, Vienne. B.W., S.G., Σ, D.M. et M.T.R.
Belgique:	Professeur BORDET et Dr RENAUX, Institut Pasteur de Bruxelles: B.W., S.G. et Σ.
Danemark:	Dr MADSEN et Assistant MOERCH, Institut Sérothérapique de l'Etat à Copenhague: B.W., S.G., Σ, D.M. et M.T.R.
Allemagne:	Professeur SACHS, Institut pour l'étude du Cancer à Heidelberg: B.W., S.G., Σ et D.M.
Grande-Bretagne:	Dr HARRISON et Dr WYLER, Medical Research Council à Londres: B.W., S.G. et Σ.

[1] Dans le texte, les abréviations suivantes sont utilisées:
B.W. = réaction de Bordet-Wassermann.
S.G. = réaction de Sachs-Georgi.
Σ = Sigmaréaction.
D.M. = troisième réaction de Meinicke;
M.T.R. = Meinicke Trübungs-Reaktion.

REPORT OF THE TECHNICAL LABORATORY CONFERENCE.

According to the decisions of the Second International Conference on the Standardisation of Sera and Serological Tests, convened by the Health Committee of the League of Nations and held from November 20th to 26th, 1922, at the Pasteur Institute, Paris, comparative study of different sero-reactions [1] of syphilis was carried out in the following laboratories in:

Austria: Professor Müller, Chief of the Sero-diagnostic Laboratory, Allgemeines Krankenhaus, Vienna: B. W., S. G., Σ, D. M., M.T.R.

Belgium: Professor Bordet and Dr. Renaux, Pasteur Institute, Brussels: B.W., S.G. and Σ.

Denmark: Dr. Madsen and Assistant Moerch, State Serum Institute, Copenhagen: B.W., S.G., Σ, D.M. and M.T.R.

Germany: Professor Sachs, Cancer Research Institute, Heidelberg: B.W., S.G., Σ and D.M.

Great Britain: Dr. Harrison and Dr. Wyler, Medical Research Council: B.W., S.G. and Σ.

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[1] In the text the following abbreviations will be used:

B.W. = Bordet-Wassermann reaction.
S.G. = Sachs-Georgi reaction.
Σ = Sigma reaction.
D.M. = Dritte Meinicke reaction.
M.T.R. = Meinicke-Trübungs reaction.

Pologne: Professeur Hirszfeld, Institut d'hygiène de l'Etat à Varsovie: B.W., S.G., Σ,D.M., M.T.R. et Dold.

Le principal objet de ces recherches était de comparer les différentes réactions de floculation avec la réaction de B.W. telle qu'elle est pratiquée dans chacun de ces laboratoires. Avant la Conférence, les différents instituts avaient envoyé des rapports indiquant le résultat de leurs travaux (voir Annexe 1). Comme il ressort de l'examen de ces rapports, un grand nombre de sérums ont été examinés dans tous les instituts par les méthodes mentionnées ci-dessus. La plupart des travailleurs admettent que, d'après leurs expériences, les réactions de floculation, dans des cas de syphilis avérée, ont montré un plus grand nombre de résultats positifs que le B.W., tout en donnant un nombre relativement peu élevé de réactions non spécifiques. Toutefois, les résultats ont été si divergents qu'une appréciation définitive de la valeur des diverses méthodes n'a pu être émise.

La *technique du B.W.* étant différente dans chacun des instituts, il fut décidé également à la Conférence de Paris de faire des recherches comparatives sur les mêmes échantillons de sérum. Le Dr Madsen (Copenhague) offrit de procurer ces sérums et de les envoyer aux laboratoires suivants:

Autriche: Professeur Müller,
Belgique: Professeur Bordet,
Allemagne: Professeur von Wassermann,
Grande-Bretagne: Dr Harrison.
Pologne: Professeur Hirszfeld,

de façon à comparer les résultats obtenus par chacun de ces laboratoires employant sa méthode habituelle pour le B.W.

Pour obtenir une concordance aussi grande que possible, tous les échantillons d'un même malade furent étudiés le même jour dans tous les instituts mentionnés. Comme il ressort du tableau I, 72 sérums ont été examinés de cette façon par le B.W. et la Σ. Dans quelques laboratoires, on y ajouta la S.G. et la M.T.R.; mais, comme ces dernières réactions ne furent exécutées que par quelques chercheurs et sur un petit nombre d'échantillons, il a été difficile de tirer des conclusions en ce qui les concerne.

Poland: Professor Hirszfeld, State Institute of Hygiene, Warsaw: B.W., S.G., Σ, D.M., M.T.R. and Dold.

The main object of these investigations was a comparison between the different flocculation tests and the B.W. test used by the individual laboratories.

Before the Conference the different institutes had already sent reports of their preceding experiments (see Annex I). As these reports indicate, a great number of sera have been examined by the methods mentioned, in all institutes. The majority of the investigators agree that in their experiences the flocculation reactions, in known cases of syphilis, have shown a greater number of positive results than the B.W., whilst giving a relatively small number of unspecific reactions. Yet the results have been so divergent that a definite decision about the efficiency of the different methods could not be given.

The *technique of the B.W.* being rather different in the different institutes, it was decided at the Paris Conference to perform comparative investigations on the *same* blood sera. Dr. Madsen, Copenhagen, offered to procure such sera and send them to the following laboratories:

Austria: Professor Müller,
Belgium: Professor Bordet,
Germany: Professor von Wassermann,
Great Britain: Dr. Harrison,
Poland: Professor Hirszfeld,

so as to compare the results obtained by each of these laboratories employing their normal technique for the B.W. test.

To obtain as great a concordance as possible, all specimens from the same patient were to be examined on the same day in all the institutes mentioned. As appears from Table 1, 72 sera have been examined in this way both by B.W. and by Σ. In some laboratories also the S.G. and M.T.R. were added, but as these latter reactions were carried out only by certain investigators and on a small scale, it has been difficult to draw conclusions as far as these flocculations are concerned.

Tab. 1.

	No.	B. W.						S. G.					Σ				
		Harrison	Hirschf.	Madsen	Müller	Renaux	v. Wassermann	Harrison	Hirschf.	Madsen	Müller	Renaux	Harrison	Hirschf.	Madsen	Müller	Renaux
25/III	1	++	+	++	++	++	++	0	++	++	0	0	0	6	3	0	0
	2	++	++	++	++	++	++	0	++	++	0	0	0	16.5	2.2	0	0
	3	++	++	++	++	++	++	0	++	++	0	0	0	66	72	0	0
	4	±	+	−	++	−	++	0	+	+	0	0	0	6	1.5	0	0
	5	++	+	++	++	++	++	0	++	++	0	0	0	8	3.6	0	0
26/IV	6	−	−	−	−	−	++	−	±	−	−	−	−	−	−	−	−
	7	−	−	−	−	−	±	−	±	−	−	−	−	−	−	−	−
	8	++	±	−	++	+	++	++	++	+	±	±	3.2	7	1.5	+	2.5
	9	++	++	++	++	++	++	0	++	+	++	++	13.7	16.6	6	+	34
	10	++	++	++	++	++	++	++	++	+	+	+	13 7	13.7	6	+	13.4
	11	++	++	++	++	++	++	++	++	++	++	+	>34	59	18	+	34
22/IX	12	++	++	++	++	++	++	0	++	++	0	++	>54	150	70	+	>54
	13	−	−	−	−	−	−	0	−	−	0	−	−	−	−	−	−
	14	±	++	−	±	++	−	0	++	+	0	±	6.8	8.7	2.2	+	13.4
	15	−	−	−	−	−	−	0	−	−	0	−	−	−	−	−	−
	16	−	−	−	−	−	−	0	±	−	0	−	−	2.1	−	−	−
	17	−	−	−	−	−	−	0	−	−	0	−	−	−	−	−	−
	18	−	−	−	±	−	−	0	−	−	0	−	−	−	−	−	2.8
	19	−	−	−	−	−	−	0	−	−	0	−	−	2.3	−	−	34
	20	++	++	++	++	++	++	0	++	++	0	+	>34	77	12	+	>54
	21	±	±	−	±	+	−	0	++	+	0	±	6.8	5.2	1.8	+	13.4
	22	−	−	−	−	−	−	0	−	−	0	−	−	1.3	−	−	−
	23	++	++	++	++	++	++	0	++	++	0	+	19.2	17.1	8	+	>54
	24	++	++	++	++	++	++	0	++	++	0	++	>54	94	44	+	>54
	25	++	++	++	++	++	++	0	++	++	0	++	>44	46	10	+	>44
	26	++	++	++	++	++	++	0	++	++	0	++	>54	117	44	+	>54
	27	−	−	−	−	−	−	0	−	−	0	−	−	−	−	−	−
6/X	28	0	−	−	±	−	−	0	++	±	+	−	0	−	−	−	−
	29	++	±	−	+	++	−	++	+	+	−	±	6.8	5.9	3	+	27
	30	++	++	++	++	++	++	++	++	++	++	+	20.6	39	10	+	>54
	31	++	++	+	++	++	++	++	++	++	++	++	18.1	16.2	3	+	34
	32	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
	33	++	++	++	++	++	++	++	++	++	++	±	44.5	92	25	+	>54
	34	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
	35	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
	36	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−

Tab. 1.

M. T. R.			Diagnosis							No.
			Syphilis							
Hirschf.	Madsen	Müller	I	II	III	Lat.	Cong.	D. p.	Control.	
0	++	0	. .	. .	. .	•t	. .	. .	. . .	1
0	++	0	. .	. .	. .	•t	. .	. .	. . .	2
0	++	0	. .	. .	. .	•t	. .	. .	. . .	3
0	++	0	. .	. .	. .	•t	. .	. .	. . .	4
0	+	0	. .	. .	. .	•t	. .	. .	. . .	5
0	—	0	. .	. .	. .	. .	. .	. .	Gonorrh.	6
0	—	0	. .	. .	. .	. .	. .	. .	Gonorrh.	7
0	+	0	. .	•t	. .	. .	. .	. .	. . .	8
0	++	0	. .	•t	. .	. .	. .	. .	. . .	9
0	++	0	. .	•t	. .	. .	. .	. .	. . .	10
0	++	0	. .	•t	. .	. .	. .	. .	. . .	11
++	++	++	. .	. .	. .	•	. .	. .	. . .	12
—	—	—	. .	. .	. .	•	. .	. .	. . .	13
+	++	+	. .	. .	. .	•	. .	. .	. . .	14
—	—	—	. .	. .	. .	. .	. .	. .	Sanus	15
—	+	—	. .	. .	. .	. .	. .	. .	Sanus	16
—	—	—	. .	. .	. .	. .	. .	. .	Sanus	17
++	—	+	. .	. .	. .	. .	. .	. .	Sanus	18
—	—	—	•	. .	. .	. .	. .	. .	. . .	19
++	++	++	. .	•t	. .	. .	. .	. .	. . .	20
++	++	—	. .	. .	. .	. .	•	. .	. . .	21
—	—	—	. .	. .	•t	. .	. .	. .	. . .	22
+	++	++	. .	•t	. .	. .	. .	. .	. . .	23
++	++	++	. .	•t	. .	. .	. .	. .	. . .	24
++	++	+	. .	. .	. .	. .	•	. .	. . .	25
++	++	++	. .	•	. .	. .	. .	. .	. . .	26
—	—	—	. .	. .	. .	. .	. .	. .	Gonorrh.	27
—	—	—	. .	. .	. .	. .	. .	. .	Gonorrh.	28
++	++	—	. .	. .	•t	. .	. .	. .	. . .	29
++	++	++	. .	. .	. .	. .	•	. .	. . .	30
++	++	+	. .	•t	. .	. .	. .	. .	. . .	31
—	—	—	. .	. .	. .	. .	. .	. .	Gonorrh.	32
++	++	++	. .	•t	. .	. .	. .	. .	. . .	33
—	—	—	. .	. .	. .	. .	. .	. .	Gonorrh.	34
—	—	—	. .	. .	. .	. .	. .	. .	Gonorrh.	35
—	—	—	. .	. .	. .	. .	. .	. .	Gonorrh.	36

Tab. 1.

No.	B. W.						S. G.					Σ				
	Harrison	Hirschf.	Madsen	Müller	Renaux	v. Wassermann	Harrison	Hirschf.	Madsen	Müller	Renaux	Harrison	Hirschf.	Madsen	Müller	Renaux
37	±	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
38	++	++	++	++	++	++	++	++	++	++	+	31	77	25	+	>54
39	−	−	−	−	−	−	++	−	±	−	−	−	−	−	−	−
40	±	++	−	+	+	−	++	++	++	−	±	8.3	5.6	1.8	+	27
41	++	++	++	++	++	++	++	++	++	−	±	16.6	23	8.8	+	>44
42	±	++	−	±	±	−	++	++	++	−	−	8.3	10.1	3	+	34
43	−	−	−	±	±	−	++	++	+	−	−	3.0	10.3	1.2	+	5.3
44	±	−	−	−	−	−	±	−	−	−	−	−	−	−	−	−
45	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
46	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
47	++	++	++	++	++	++	++	++	++	++	++	>44	57	16	+	>54
48	++	++	++	++	++	++	++	++	++	++	++	>31	106	15	+	>54
49	++	++	++	++	++	++	++	++	++	++	++	>44	127	10	+	>54
50	−	+	−	−	−	−	++	++	−	−	++	−	−	−	−	1.3
51	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
52	++	++	++	++	++	+	++	++	++	++	++	29.5	53	5.5	+	>54
53	++	++	++	++	++	±	++	++	++	++	±	6.8	9.4	2,5	+	13.4
54	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
55	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
56	−	−	−	*	−	−	−	−	−	−	−	−	−	−	−	−
57	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
58	++	++	++	++	++	++	++	++	++	++	++	27	237	50	+	>54
59	++	++	++	++	++	++	++	++	++	++	++	>27	437	60	+	>54
60	0	+	−	±	−	−	0	++	+	−	−	0	9	1.5	+	5.3
61	++	++	++	++	++	++	0	++	++	++	++	121	198	25	+	>54
62	±	+	−	+	−	±	±	++	−	−	−	3.2	6.3	1.5	+	13.4
63	−	−	−	−	−	+	−	−	−	−	−	−	−	−	−	−
64	−	−	−	−	−	−	++	++	−	−	−	−	−	−	−	−
65	−	−	−	−	−	−	0	−	−	−	−	−	−	−	−	−
66	−	−	−	+	−	++	±	−	−	−	−	−	−	−	−	−
67	++	0	−	++	−	0	0	0	−	−	−	−	−	−	−	2.5
68	−	−	−	−	−	±	0	−	−	−	−	−	−	−	−	−
69	−	−	−	−	−	±	−	−	−	−	−	−	−	−	−	−
70	−	−	−	−	−	++	−	−	−	−	−	−	−	−	−	−
71	++	++	++	++	++	++	0	++	++	++	++	>34	119	8.8	+	>54
72	−	−	−	−	−	±	−	−	−	−	−	−	−	−	−	−

* React. parad.

Tab. 1.

M. T. R.			Diagnosis							No.
			Syphilis						Control	
Hirschf.	Madsen	Müller	I	II	III	Lat.	Cong.	D. p.		
−	−	−							Sanus	37
±	±	±					●			38
−	−	−							Ulcus ven.	39
±	±	±				●t				40
±	±	±	●t							41
±	±	±						●t		42
±	±	+					●			43
−	−	−							Gonorrh.	44
−	−	−							Gonorrh.	45
−	−	−							Gonorrh.	46
±	±	±		●t						47
±	±	±			●t					48
±	±	±		●t						49
±	−	−							Herpes gen.	50
−	−	−							Gonorrh.	51
±	±	±				●				52
±	+	±		●						53
−	−	−							Ulc. ven.	54
−	−	−			●t					55
−	−	−							Gonorrh.	56
−	−	−							Sanus	57
±	±	±		●t						58
±	±	±		●t						59
±	±	±					●			60
±	±	±			●					61
±	−	±	●							62
−	−	−				●t				63
±	−	−				●t				64
−	−	−				●t				65
−	−	−				●t				66
−	+	−				●t				67
−	−	−				●t				68
−	−	−				●t				69
−	−	−				●t				70
±	±	±				●t				71
−	−	−				●t				72

L'examen du tableau 1 montre que les chiffres d'unités Sigma indiqués par Copenhague sont beaucoup plus faibles que ceux trouvés par les autres instituts. Pour élucider la cause de cette discordance, on a soumis à un examen spécial l'extrait et la cholestérine utilisés.

L'*extrait* fut examiné par le professeur Dreyer à Oxford. Pour des raisons non élucidées, il était devenu plus faible au point que le facteur de suspension s'était élevé jusque 2,3 au lieu de 1,6, chiffre indiqué lors de l'envoi; cependant, un échantillon du même extrait conservé à Oxford avait gardé le même facteur de suspension de 1,6.

La *cholestérine* (Kahlbaum) fut trouvée beaucoup plus faible que trois autres cholestérines qui lui furent comparées. Ce fut le cas également pour un cinquième échantillon de cholestérine Kahlbaum.

Vu la modification du facteur de suspension signalée ci-dessus, toutes les unités Sigma de Copenhague devraient être augmentées proportionnellement (jusqu'au double environ). En ce qui concerne l'expression en unités Sigma des résultats des autres travailleurs, voir les rapports à l'annexe I.

Le tableau 1 donne des indications sur la sensibilité et la spécificité de ces différentes techniques de B.W. Les réactions de floculation sont à certains égards supérieurs au B.W., mais cette comparaison démontra l'existence de grandes différences dans les résultats obtenus par les chercheurs. Ce fut spécialement le cas pour le titrage de la Sigmaréaction. Si la limite entre une réaction positive et une réaction négative était à peu près la même pour tous les chercheurs, la précision de la réaction, ou tout au moins son expression en unités Sigma, était singulièrement différente, quoiqu'on ait utilisé un seul et même extrait envoyé par Oxford et que des instructions précises sur tous les détails aient été données par les auteurs de la méthode.

En vue de déterminer les raisons de ces divergences, le Comité d'hygiène de la Société des Nations décida de convoquer une conférence au cours de laquelle les chercheurs feraient simultanément des examens des mêmes sérums par les différentes méthodes. Cette Conférence se réunit à l'Institut Sérothérapique de l'Etat à Copenhague, du 19 novembre au 3 décembre 1923. Les personnes suivantes participèrent à l'examen des sérums:

Dr Harrison
Dr Wyler
} Medical Research Council à Londres.

Professeur Hirszfeld
Assistante: Mme Milinska
} Institut d'hygiène de l'Etat à Varsovie.

It appears from Table 1 that the Σ units reported from Copenhagen are considerably lower than those found by the other institutes. To clear up this discordance (1) the extract and (2) the cholesterin used were examined.

The extract was examined by Professor Dreyer, Oxford, who found that for some unknown reason it had become weaker, so that the suspension factor had increased to 2.3 instead of as indicated 1.6; this in spite of the fact that a sample of the same extract kept in Oxford still had the original suspension factor of 1.6.

The *cholesterin* (Kahlbaum) was found by comparison with three other different cholesterins to be considerably weaker than these. The same was the case with a fifth sample of Kahlbaum's cholesterin.

In accordance with the alteration in the suspension factor mentioned above, all the Σ units reported from Copenhagen should be proportionately increased (to about the double). As to the Σ units reported by the other investigators, see the reports in Annex I.

Table 1 gives information about the sensitiveness and specificity of these different B.W. modifications. The flocculation reactions are to a certain degree superior to the B.W. reaction; but, on the other hand, this comparison demonstrated the existence of great differences in the results obtained by the investigators. This was especially evident in the quantitative titration of the Σ test. Whilst the limit between a positive and a negative reaction was about the same for all investigators, the strength of the reaction as expressed in Σ units was strikingly different in spite of the fact that one and the same extract delivered from Oxford was used and that precise instructions about all details were given by the authors of the method.

In order to determine the cause for these divergences, the Health Committee of the League of Nations decided to convene a Conference at which the investigators were to make simultaneous tests of the same sera by the different methods. This Conference was held in the State Serum Institute, Copenhagen, from November 19th to December 3rd, 1923. The following persons participated at the examination of the sera:

Dr. Harrison, Dr. Wyler — Medical Research Council, London.

Professor Hirszfeld, Assistant: Mrs. Milenska — State Institute of Hygiene, Warsaw

Dr Madsen, président
Assistant: J. R. Mörch
} Institut Sérothérapique de l'Etat à Copenhague.

Dr Meinicke
Assistante: Mme Meinicke
} Institut des maladies du poumon Ambrock à Hagen i. Westph.

Professeur Müller
Assistante: Mme Berczeller
Assistant Dr Brandt
} Laboratoire sérodiagnostique, Allgemeines Krankenhaus, Vienne.

Dr Mutermilch: Institut Pasteur de Paris.

Professeur Otto
Assistant: Dr Munter
} Institut de l'Etat pour maladies infectieuses R. Koch, Berlin.

Dr Renaux
Assistante: Mlle Jobart
} Institut Pasteur de Bruxelles.

Professeur Sachs
Assistant: Dr Klopstock
} Institut pour l'étude du cancer à Heidelberg.

En outre, les personnes suivantes participèrent à la Conférence:

Dr Armstrong
Dr Dyer
} Laboratoire d'Hygiène, Service de la Santé publique, Etats-Unis d'Amérique.

Professeur Forssman: Institut de Pathologie à Lund (Suède).

Professeur Petragnani: Dir. Institut d'Hygiène de Florence (Italie).

Au cours de la Conférence, 536 sérums furent éprouvés pendant les dix jours consacrés à ce travail. Les échantillons furent prélevés de préférence chez des syphilitiques traités et non traités, aux différents stades de la maladie. Comme contrôles, on recueillit des sérums de cliniques et d'hôpitaux divers en s'attachant spécialement aux circonstances qui sont considérées comme susceptibles de provoquer des résultats non spécifiques, telles, par exemple, la tuberculose, les tumeurs et la grossesse.

Dr. Th. Madsen, President
Assistant: J. R. Moerch
} State Serum Institute, Copenhagen.

Dr. Meinicke,
Assistant: Mrs. H. Meinicke
} Lungenheilstätte Ambrock, Hagen in Westphalia.

Professor Müller
Assistant: Mrs. Berczeller
Assistant: Dr. Brandt
} Sero-diagnostic Laboratory, Allgemeines Krankenhaus, Vienna.

Dr. Mutermilch, Institut Pasteur, Paris.

Professor Otto
Assistant: Dr. Munter
} Staatliches Institut für Infektions-Krankheiten "Robert Koch". Berlin.

Dr. Renaux
Assistant: Miss Jobart
} Institut Pasteur, Brussels.

Professor Sachs
Assistant: Dr. Klopstock
} Cancer Research Institute, Heidelberg.

Furthermore, the following persons participated in the Conference:

Dr. Armstrong
Dr. Dyer
} Hygienic Laboratory, U.S.A., Public Health Service, U.S.A.

Professor Forssman, Pathological Institute Lund, Sweden.

Professor Petragnani, Director, Istituto d'Igiene, Florence, Italy.

During the Conference, 536 sera were tested during 10 working days. The samples of serum were preferably drawn from syphilitic patients, both treated and untreated in different stages of the disease. As controls, sera were obtained from various clinics and hospitals, with special reference to conditions which are suspected of giving unspecific results, as for instance tuberculosis, tumour and pregnancy.

Les directeurs de clinique ci-après ont, avec la plus grande obligeance, mis des échantillons de sang à la disposition de la Conférence:

Professeur Bie: Blegdamshospitalet (Hôpital pour maladies infectieuses).

Médecin en chef Bing: Kommunehospitalets II. Afd. (maladies internes).

Médecin en chef Bisgaard: St. Hans Hospital (Asile d'aliénés).

Professeur Faber: Rigshospitalets Afd. B. (maladies internes).

Professeur Gammeltoft, Professeur Hauch } Rigshospitalets Födeafd (Maternité).

Médecin en chef Jersild: Rudolph Berghs Hospital (maladies vénériennes).

Dr Levy, Dr Lomholt } Kommunens vederlagsfri Consultation (Dispensaire pour mal. vénériennes).

Professeur Rasch: Rigshospitalet (Clinique universitaire des maladies vénériennes).

Médecin en chef Reyn: Finsens medicinske Lysinstitut.

Médecin en chef Thalbitzer: St. Hans Hospital (Asile d'aliénés)

Médecin en chef Tobiesen: Öresundshospitalet (Hôpital pour tuberculeux).

Médecin en chef Vogelius: St. Johannes Stiftelse (Salpêtrière).

Professeur Wimmer: Kommunehospitalets VI. Afd. (maladies mentales).

Médecin en chef Würtzen: Öresundshospitalet (Hôpital pour tuberculeux).

The following directors of clinics have in the most liberal way placed blood samples at the disposal of the Conference:

Professor Bie, Blegdamshospitalet (Hospital for Infectious Diseases).

Overlæge Bing, Kommunehospitalets II. Afd. (Internal Diseases).

Overlæge Bisgaard, St. Hans Hospital (Asylum for the Insane).

Professor Faber, Rigshospitalets Afd. B. (Internal Diseases).

Professor Gammeltoft } Rigshospitalets Födeafd.
Professor Hauch } (Maternity).

Overlæge Jersild, Rudolph Berghs Hospital (Venereal Diseases).

Dr. Levy } Kommunens vederlagsfri Consultation
Dr. Lomholt } (Venereal Diseases Dispensary).

Professor Rasch, Rigshospitalet (University Clinic for Venereal Diseases).

Overlæge Reyn, Finsens Medicinske Lysinstitut.

Overlæge Thalbitzer, St. Hans Hospital (Asylum for the Insane).

Overlæge Tobiesen, Öresundshospitalet (Tuberculosis Hospital).

Overlæge Vogelius, St. Johannes Stiftelse (Salpêtrière).

Professor Wimmer, Kommunehospitalets VI. Afd. (Mental Diseases).

Overlæge Würtzen, Öresundshospitalet (Tuberculosis Hospital).

Immédiatement après la saignée, les échantillons de sang étaient envoyés à l'Institut; l'examen était pratiqué le lendemain.

Comme certains sérums étaient en quantité insuffisante, ils ne purent être examinés par tous les travailleurs au moyen des diverses techniques. Onze liquides cérébrospinaux seulement purent être examinés, car il fut impossible d'obtenir un matériel d'examen suffisant pour neuf travailleurs dans un plus grand nombre de cas.

La technique utilisée pour les différents essais à cette conférence a été formulée comme suit par les divers expérimentateurs.

I. La réaction B.W.

Dr Harrison.

Voir Medical Research Council Special Report, Series N° 14, Method N° 1.

Professor Hirszfeld.

Technique de *McIntosh* et *Fildes* (Medical Research Council Report, Series 14, 1918).

Antigènes utilisés:

1) l'antigène recommandé par les auteurs ci-dessus (Extrait de cœur humain 0,3 + cholestérine 0,2 + NaCl 7,0);
2) l'antigène de Bordet-Ruelens.

Dr Madsen.

Technique indiquée par *Oluf Thomsen* (Zeitschr. für Immunitätsforschung und experimentelle Therapie, Bd. VII, et *Boas*: Die Wassermann'sche Reaktion III, éd. 1922).

Outre l'extrait de cœur humain, on a employé aussi un extrait de foie syphilitique. Si l'extrait de foie donnait un résultat positif et l'extrait de cœur un résultat négatif ou vice versa, la réaction était indiquée comme ±.

Dr Mutermilch.

Technique de *Bordet-Wassermann* avec sérum actif, actuellement employée à l'Institut Pasteur, Paris.

Procédé de *Bauer-Hechl*, modifié par *Levaditi* et *Latapie* (1911), *Weinberg* (1912), *Mutermilch* et *Latapie* (1922).

Antigène de *Bordet* et *Ruelens*. (Epuisement direct par l'acétone sans contact préalable avec l'alcool. Extraction à l'alcool. Pas d'évaporation de l'alcool au moment de l'emploi.)

Sérum humain à l'état actif.

Hématies de mouton lavées une ou deux fois et ramenées au volume primitif, émulsion à 5 %.

Détermination de l'index hémolytique pour chaque sérum (procédé de *Weinberg*).

Addition d'un tiers du maximum de globules hémolysés par 0,1 ccm. de sérum.

Immediately after the bleeding of the patient, the samples were sent to the Institute and examined the following day.

As the quantity of some of the sera was rather small, such samples could not be tested by all the investigators with each of the methods in question. Only 11 cerebro-spinal fluids could be examined, as it was impossible to obtain sufficient material for all nine investigators in more than this number of cases.

The *technique* used for the different tests at this Conference has been indicated by the different investigators as follows:

For the B. W. Test.

Dr. HARRISON.

See Medical Research Council Special Reports, Series No. 14, Method No. 1.

PROFESSOR HIRSZFELD.

Technique according to *McIntosh* and *Fildes* (Medical Research Council's Report, Series 14, 1918), except that besides the antigen recommended by them (human heart extract 0.3, cholesterin 0.2 — NaCl 7.0), the antigen of Bordet-Ruelens was also employed.

Dr. MADSEN.

Technique indicated by *Oluf Thomsen* (Zeitschrift f. Immunitätsforschung und experimentelle Therapie, Bd. VII) and *Boas:* Die Wassermann'sche Reaktion, III ed. 1922.

Besides extract of human heart, extract of syphilitic liver was also used. If the liver extract gave a positive and heart extract a negative result, or *vice versa*, the reaction was indicated as ±.

Dr. MUTERMILCH.

Technique with active serum as used at the Institut Pasteur, Paris.

Procedure of *Bauer-Hecht* modified by *Levaditi* and *Latapie* (1911), *Weinberg* (1912), *Mutermilch* and *Latapie* (1922).

Antigen of *Bordet* and *Ruelens*, direct extraction with acetone without previous contact with alcohol. Then extraction with alcohol. The alcohol is not evaporated previous to use.

Active human serum.

Sheep's blood corpuscles washed once or twice and restored to original volume, 5% emulsion.

Determination of haemolytic index for each serum (*Weinberg's* procedure).

Addition of one-third of the greatest amount of corpuscles which could be haemolysed by 0.1 cc. serum.

Emploi de l'alexine (complément) et de la sensibilisatrice (amboceptеur) humaines normales (sérum humain négatif, actif et titré en présence de l'antigène) pour les sérums qui ne contiennent pas de ces substances et pour les liquides céphalo-rachidiens.

Professeur Müller.

1. *Dispositif de l'expérience.* — Au lieu des pipettes divisées généralement employées, nous utilisons des pipettes compte-gouttes dont 1 goutte représente 0,05 cc. d'eau salée physiologique. Les sérums et les réactifs (à l'exception de l'antigène) ne sont pas dilués avant l'emploi. La solution de sel de cuisine qui sert dans d'autres méthodes à diluer séparément chaque réactif est, dans notre technique, répartie préalablement en totalité dans chaque éprouvette au moyen d'un appareil simple, à raison de 2,5 cc. par tube. On y ajoute 4 gouttes de sérum, 5 gouttes de la dilution d'antigène décrite au paragraphe 2 et 1 goutte de complément, c'est-à-dire $1\,^1/_2$ fois la quantité de complément nécessaire pour provoquer l'hémolyse[1]. Dans chaque cas, on laisse un tube sans extrait pour l'essai du pouvoir anticomplémentaire du sérum. Après 1 heure à l'étuve, addition du système hémolytique; 1re lecture après hémolyse du plus grand nombre possible de contrôles normaux; 2me lecture une heure plus tard.

2. *Préparation de l'extrait.* — 10 grammes de cœur de bœuf finement haché sont agités avec 100 gr. d'alcool absolu, placés 12 heures à 56° puis 24 heures à la température de la chambre. On filtre. Ces solutions-mères de lipoïdes ne peuvent être utilisées qu'après 2 à 3 semaines pour la préparation de l'antigène qui doit servir à la réaction et que l'on obtient comme suit: 20 cc. solution mère, additionnés de 4 cc. d'une solution alcoolique $^1/_2$ % de cholestérine, sont placés dans des éprouvettes graduées de $2\,^1/_2$ cm. de diamètre, évaporés dans un bain-marie électrique jusqu'à réduction à un volume de 8 cc., puis versés brusquement dans un vase à précipiter de 7 cm. de diamètre environ, contenant 5 cc. d'eau physiologique (NaCl 0,9 %). Immédiatement après, on verse aussi rapidement que possible d'un 2me verre, où on les avait mesurés préalablement, 20 cc. d'eau physiologique. La non-interruption de la manœuvre est une condition fondamentale de la réussite. Pour porter ces extraits à l'état colloïdal le plus actif, un processus de maturation à la température de 56° est encore nécessaire. Le temps de maintien à 56° varie, selon les propriétés de la solution-mère, entre 12 et 24 heures, pendant lesquelles les lipoïdes se précipitent complètement. L'extrait refroidi peut être utilisé après agitation énergique sans nouvelle dilution.

L'extrait brut utilisé à cette conférence donnait un antigène d'activité optimale et de bonne spécificité après un séjour de 24 heures à 56°.

Professor Otto.

Les recherches ont été exécutées, au début de la Conférence, comme elles le sont à l'Institut Robert Koch, avec 2 extraits de foie syphilitique et un extrait cholestériné de cœur de bœuf. Plus tard, on a utilisé un seul extrait de foie syphilitique en même temps qu'un extrait cholestériné de cœur de bœuf et un extrait de cœur humain. Cette modification fut apportée parce que l'on a constaté que nos extraits de foie syphilitique, qui sont additionnés d'extrait de cœur de cobaye, ont donné ici (contrairement à notre expérience de Berlin) des résultats trop forts et que, de plus, l'examen des mêmes sérums,

[1] L'auteur n'emploie le complément qu'après un essai préliminaire où il s'est montré actif à la dose de $^9/_{40}$ à $^7/_{10}$ de goutte. Tout complément plus faible est rejeté. La dose de 1 goutte représente donc alors $1\,^1/_2$ fois la quantité de complément nécessaire pour provoquer l'hémolyse.

In the case of serum devoid of complement and amboceptor, and in the case of cerebro-spinal fluid, amboceptor and complement are added in the form of normal human serum (active human serum which is negative and titrated in the presence of antigen).

PROFESSOR MÜLLER.

1. *Performance of experiment:* Instead of the usual graduated pipettes, drop pipettes are used, a drop from which is equal to 0.05 cc. normal salt solution. The sera and the reagents (the antigen excepted) are not diluted before they are added. The NaCl solution, used in the other methods for the dilution of the individual reagents, is in our method first dropped into the tubes, a simple apparatus being used for the purpose: the amount placed in each tube is 2.5 cc. To this NaCl solution is added four drops of serum, five drops of the dilution of antigen, described below under (2) and one drop of the complement, *i.e.* $1^1/_2$ times the hemolytic amount of complement[1]. For each sample of serum, 1 tube without extract is put up to test the self-inhibition of the serum. After one hour in the incubator, the haemolytic system is added. The first reading is made after hemolysis has occurred in as many normal controls as possible; the second reading is made one hour later.

2. *Preparation of the extract:* 10 g. ox-heart, well minced, is shaken with 100 gr. absolute alcohol, left 12 hours at 56° C. and 24 hours at room temperature and then filtered. This extract must be kept from two to three weeks before it can be employed for the preparation of the diluted extract used in the test. This is made in the following way: 20 cc. of the mother extract plus 4 cc. of $^1/_2$ % alcoholic solution of cholesterin are evaporated, in graduated tubes of 2.5 cm. diameter, by means of an electrical evaporating apparatus until the volume has decreased to 8 cc.; it is then poured quickly into a beaker of 7 cm. diameter, containing 5 cc. of a 0.9% NaCl solution. Twenty cc. of a 0.9% NaCl solution are added as quickly as possible from a second beaker, kept ready for this purpose. It is essential for a successful result that these mixtures be made without delay. Furthermore, a process of maturing at 56° C. is necessary to obtain the most favourable colloidal condition of these extracts. The time required for this process varies between 12 and 24 hours according to the qualities of the mother extract. During this time all the lipoids are precipitated. The extracts are then used cold after vigorous shaking and without further dilution. The mother extract used at this Conference yielded, after 24 hours at 56°, an antigen of maximum efficiency and of satisfactory specificity.

PROFESSOR OTTO:

The investigations were first carried out as in Robert Koch's Institute in Berlin, with two extracts of syphilitic liver and one cholesterinised extract of ox-heart. Later on, only one extract of syphilitic liver and simultaneously one extract of cholesterinised ox-heart and one extract of human heart were used. This change was made, because it was found that the syphilitic liver-extract to which extracts of guinea-pig's heart had been added, gave results in Copenhagen which were too strongly positive (in contrast to our Berlin experiences) and which on repetition of tests of the same sera on the

[1] No complement is used for the reaction unless a preliminary test shows that it is active in a dose of 0.6 to 0.7 of a drop. The dose of one drop represents therefore one and a-half times the amount necessary for the haemolosis (M.H.D.)

répété le lendemain, a fourni des réponses discordantes. (Peut-être faut-il chercher la cause de ce mécompte dans le fait que nous n'examinons jamais à Berlin des sérums tout fraîchement inactivés, mais au plus tôt 24 heures après l'inactivation, étant donné qu'il s'agit d'échantillons de sérums envoyés de l'extérieur.)

Le procédé qui reposait désormais principalement sur l'emploi des 2 extraits préparés sans foie syphilitique s'est démontré trop faible, ce qui concorde avec nos observations antérieures. Nous avons obtenu, en effet, plusieurs résultats non décisifs, mais, néanmoins, aucune réaction positive non spécifique.

Dr E. Renaux. (Bordet et Ruelens C.R. Soc. Biologie 1919.)

Réactifs : Antigène : Extrait ***Bordet-Ruelens*** préparé suivant la technique indiquée en annexe.

Alexine (complément): Sérum frais de cobaye.

Globules rouges : Sang défibriné de chèvre, lavé 3 fois, ramené au volume primitif, puis dilué de 2 fois son volume d'eau physiologique à 9 °/oo (NaCl 0,9 %).

Sensibilisatrice (Ambocepteur): Sérum de lapin antichèvre inactivé 30 minutes à 56°.

Essai préliminaire : Préparer des globules sensibilisés à des titres différents, par exemple:

1 goutte de sensibilisatrice + 20 gouttes globules dilués.
1 » » + 30 » »
1 » » + 40 » »
1 » » + 50 » »
1 » » + 60 » »

(Les chiffres de sensibilisation pourront être modifiés en tenant compte de l'action hémolytique de la sensibilisatrice utilisée.)

a)

N°	Eau physiologique	Alexine		Globules sensibilisés
1	1 ccm.		1 goutte	1 goutte au 1/20
2	»		»	» 1/30
3	»	dil. 50 %	»	» 1/40
4	»		»	» 1/50
5	»		»	» 1/60
6	»		»	» 1/20
7	»		»	» 1/30
8	»	dil. 75 %	»	» 1/40
9	»		»	» 1/50
10	»		»	» 1/60
11	»		»	» 1/20
12	»		»	» 1/30
13	»	pure	»	» 1/40
14	»		»	» 1/50
15	»		»	» 1/60

Après 20 minutes à 37°, constater quelle dilution d'alexine est suffisante et l'utiliser pour l'épreuve suivante, ainsi que pour l'épreuve définitive.

following day yielded divergent results. (The cause for this divergence may perhaps be ascribed to the fact that we in Berlin never use the serum immediately after inactivation but only after the lapse of at least 24 hours. In Berlin the blood-samples are sent from outside.)

The procedure, which was based on the use of the two heart extracts (thus omitting the extracts of syphilitic liver), was, conformably with our earlier experience, found too weak; we obtained in fact several negatives which (by comparison with the results of the other investigators) should have reacted positively. On the other hand there were no unspecific positive reactions.

Dr. Renaux (Bordet-Ruelens. C.R. Soc. Biologique, 1919).

Reagents: Antigen: Extract of ***Bordet-Ruelens*** prepared according to the technique indicated in the annex.

Complement: Fresh guinea-pig serum.

Red blood corpuscles: Defibrinated goat's blood, washed three times, restored to the original volume and diluted twice its volume of a 0.9% NaCl solution.

Amboceptor: Rabbit serum anti-goat, inactivated 30 minutes at 56°.

Preliminary titration: Blood corpuscles are sensitised in different strengths, *e.g.:*

1	drop of	amboceptor	+	20	drops	of diluted	blood corpuscles.
1	,,	,,	+	30	,,	,,	,, ,,
1	,,	,,	+	40	,,	,,	,, ,,
1	,,	,,	+	50	,,	,,	,, ,,
1	,,	,,	+	60	,,	,,	,, ,,

The figures for the sensitisation could be modified according to the haemolytic activity of the amboceptor employed.

[a] No.	0.9% NaCl.	Complement		Sensitised blood corpuscles
1	1 cc.	dil. 50 %	1 drop	1 drop of 1/20
2	,,		,,	,, 1/30
3	,,		,,	,, 1/40
4	,,		,,	,, 1/50
5	,,		,,	,, 1/60
6	,,	dil. 75 %	,,	,, 1/20
7	,,		,,	,, 1/30
8	,,		,,	,, 1/40
9	,,		,,	,, 1/50
10	,,		,,	,, 1/60
11	,,	pure	,,	,, 1/20
12	,,		,,	,, 1/30
13	,,		,,	,, 1/40
14	,,		,,	,, 1/50
15	,,		,,	,, 1/60

After 20 minutes at 37° it is ascertained which dilution of complement is sufficient for the following test as well as for the test proper.

b)

N°	Eau physiologique	Antigène	Alexine diluée suivant *a*)	Globules sensibilisés		
1	1 ccm.	0,16 cc. ou 4 gout.	1 goutte	1 heure à 37°	1 goutte	
2	»	»	»		2 gouttes	au 1/20
3	»	»	»		3 »	
4	»	»	»		1 »	
5	»	»	»		2 »	au 1/30
6	»	»	»		3 »	
7	»	»	»		1 »	
8	»	»	»		2 »	au 1/40
9	»	»	»		3 »	
10	»	»	»		1 »	
11	»	»	»		2 »	au 1/50
12	»	»	»		3 »	
13	»	»	»		1 »	
14	»	»	»		2 »	au 1/60
15	»	»	»		3 »	

Après 30 minutes, considérer comme sensibilisation optimale celle qui donne hémolyse complète d'une goutte de globules, hémolyse presque complète de deux gouttes, hémolyse marquée de trois gouttes. C'est cette sensibilisation qui est choisie pour l'essai définitif.

Essai définitif.

Sérum inactivé	Antigène	Alexine [1]	Eau phys.	Gobules sensibilisés suivant essai préliminaire	
0,05 ccm.	4 gouttes	1 goutte	1 ccm.	1 heure à 37°	1 goutte
0,1 »	»	»	»		»
0,1 »	»	»	»		»

[1] D'après l'essai préliminaire.

Professor Sachs.

D'après les prescriptions de l'Empire allemand avec complément dilué 1/10:

différents { *a*) Extrait de foie syphilitique cholestériné; *b*) Extrait de cœur de bœuf cholestériné; *c*) Extrait de cœur de bœuf cholestériné.

En outre, avec complément dilué 1/20,

d) Extrait de cœur de bœuf cholestériné.

II. **Réaction S. G.**

Professor Sachs.

a) d'après la technique originale;

b) 0,2 cc. de sérum + 0,5 cc. extrait de cœur de bœuf (cholestériné) dilué au 1/6, à l'étuve ou au bain-marie, dans les petits tubes prescrits pour la Sigmaréaction.

[b] No.	0.9 % NaCl.	Antigen.	Complement diluted according to [a]		Sensitised blood corpuscles.
1	1 cc.	0.16 or 4 drops	1 drop	1 hour at 37°	1 drop
2	,,	,,	,,		2 drops } of 1/20
3	,,	,,	,,		3 ,,
4	,,	,,	,,		1 drop
5	,,	,,	,,		2 drops } of 1/30
6	,,	,,	,,		3 ,,
7	,,	,,	,,		1 drop
8	,,	,,	,,		2 drops } of 1/40
9	,,	,,	,,		3 ,,
10	,,	,,	,,		1 drop
11	,,	,,	,,		2 drops } of 1/50
12	,,	,,	,,		3 ,,
13	,,	,,	,,		1 drop
14	,,	,,	,,		2 drops } of 1/60
15	,,	,,	,,		3 ,,

After 30 minutes, that degree of sensitisation is taken as optimal which gives complete hemolysis with one drop of corpuscles, almost complete hemolysis with two drops and marked hemolysis with three drops. It is this sensitisation which is chosen for the test proper.

Test proper.

Inactivated serum.	Antigen.	Complement[1]	0.9 % NaCl		Sensitised blood corpuscles.[1]
0.05 cc.	4 drops	1 drop	1 cc.	1 hour at 37°	1 drop
0.1 ,,	,,	,,	,,		1 ,,
0.1 ,,	,,	,,	,,		1 ,,

[1] According to the preliminary titration.

Professor Sachs.

According to the German "Reichsvorschrift":

different { (*a*) chol. syphilitic liver extract; (*b*) ,, ox-heart extract; (*c*) ,, ,, ,, } with 1/10 complem.

(*d*) ,, ,, ,, with 1/20 complement.

II. For the S. G. Test.

Professor Sachs.

(*a*) According to the original directions.

(*b*) 0.2 cc. serum with 0.5 cc. cholesterinised ox-heart diluted one-sixth, in incubator or water-bath in small sigma-tubes.

Précautions importantes :

1. Température régulière (37,5°);
2. Eau physiologique ne contenant pas de sels de calcium;
3. Emploi de tubes à paroi mince, mais de large diamètre (16 mm.):
4. Un bon agglutinoscope.

III. **Sigmaréaction.**

Dr Harrison (Dr Wyler).

Exactement suivant les prescriptions originales publiées dans « Medical Research Council. The Serum Diagnosis of Syphilis. The Wassermann and Sigma Reactions compared ». L'extrait pour la Sigmaréaction était dilué par le Dr Wyler lui-même.

Dr Madsen (Assistant Moerch).

Comme il était difficile de se procurer toujours des quantités suffisantes de sérum pour exécuter les tubes prescrits par les auteurs, le premier tube avec l'antigène α n'était pratiqué que pour les sérums donnant une M.T.R. positive et tous les tubes de 1 à 7 étaient alors exécutés. En cas de M.T.R. négative, seuls les tubes 2 et 5 étaient pratiqués. Toutes les répartitions étaient faites au moyen de pipettes graduées.

Dr Renaux.

Technique originale de Sachs-Georgi.
Antigènes originaux B et II.
Répartition des sérums au moyen de rhéomètres de Vernes.

Un certain nombre d'essais (à partir du N° 320) ont été pratiqués en utilisant concurremment avec l'extrait original II de *Sachs* l'antigène *Bordet-Ruelens* dilué goutte à goutte comme pour la Sigmaréaction, mais dans la proportion de 1:18. Les résultats obtenus avec ce dernier extrait, un peu plus faibles parfois que ceux fournis par l'extrait original II de *Sachs*, concordent cependant dans l'ensemble.
Lecture après 20 heures d'agglutinoscope.

Les autres observateurs.

Technique originale.
On pratique autant que possible les 5 premiers tubes.
Technique originale modifiée seulement pour la répartition des sérums qui se fait au rhéomètre de Vernes de la façon suivante:
(Rhéomètre réglé à 0,2 cc.).

Tube 1 : 0,4 cc. de sérum pur.
2 : 0,2 cc. »
3 : 0,2 cc. de sérum pur et 0,2 cc. eau physiologique. Mélanger. Reprendre 0,2 cc. et porter dans le tube 4.
4 : 0,2 cc. de sérum dilué du tube 3 et 0,2 cc. eau physiol. Mélanger. Reprendre 0,2 cc. et porter dans le tube 5.
5 : 0,2 cc. de sérum dilué du tube 4 et 0,2 cc. eau physiol. Mélanger. Reprendre 0,2 cc. et les rejeter.

Antigène α 0,12 pour le tube 1.
Antigène β 0,30 pour les tubes 2 à 5.

Les dilutions totales du sérum, légèrement différentes de celles de *Dreyer* et *Ward*, sont donc, en définitive, dans ces tubes:

Important conditions are:

1. Uniform temperature 37.5°.
2. Physiological solution of NaCl free from calcium.
3. The use of thin-walled tubes of sufficient width (16 mm. diameter).
4. A good agglutinoscope.

III. Σ Test.

Dr. Harrison (Dr. Wyler).

Strictly according to the original description as published in "Medical Research Council. The Diagnosis of Syphilis. The Wassermann and Sigma Reactions compared." 1923. Extracts were diluted by Dr. Wyler himself.

Dr. Madsen (Assistant Moerch).

As it was difficult always to obtain sufficient quantities of serum for all the tubes prescribed by the authors, the first tube with α suspension was only added in the case of sera giving a positive M.T.R. result. In such positive M.T.R. cases, therefore, tubes 1 to 7 were used. Where M.T.R. was negative, only tubes 2 and 5 were put up. For the measurements a graduated pipette was used.

Dr. Renaux.

Original S.-G. technique.
Original antigens B and II.
Distribution of the sera by the rheometer of Vernes.

For a certain number of tests (from No. 320), besides the original extract II of *Sachs*, *Bordet-Ruelens* antigen was also used, diluted drop after drop as for the Σ, but in the proportion 1 : 18. The results were slightly weaker than with the original extract of *Sachs*, but otherwise concording.

Reading after 20 hours on the agglutinoscope.

The other Investigators.

According to the original directions.

As far as possible, the first five tubes are put up. Original technique only modified as distribution of sera is concerned; this is made by the rheometer of Vernes in the following manner: (Rheometer à 0.2 cc.).

Tube 1. 0.4 cc. of pure serum.
2. 0.2 cc. „ „
3. 0.2 cc. „ „ +0.2 cc. 0.9% NaCl; of this mixture 0.2 cc. is taken for tube 4.
4. 0.2 cc. of diluted serum from tube 3 + 0.2 cc. 0.9% NaCl; of this mixture 0.2 cc. is taken for tube 5.
5. 0.2 cc. of diluted serum from tube 4 + 0.2 cc. 0.9% NaCl. Of this mixture 0.2 cc. is thrown away.

Antigen α: 0.12 cc. for tube 1.
Antigen β: 0.30 cc. for tubes 2 to 5.

The final dilutions of serum, slightly different from those of *Dreyer & Ward* will thus be:

Tube 1 : 1:1,3.
2 : 1;2,5.
3 : 1:5.
4 : 1:10.
5 : 1:20.

Les dilutions d'antigènes α et β étaient préparées par le Dr Moerch. Bain-marie à 37 degrés, *couvert*, circonstance capitale à laquelle j'attribue la faiblesse des résultats que j'ai obtenus à Copenhague. Tubes la moitié aux deux tiers immergés.

Lecture après 20 heures à l'appareil utilisé dans les laboratoires du « Statens Serum Institut » et à la loupe.

IV. D. M. réaction

Fut exécutée strictement suivant les indications de l'auteur.

V. M. T. R.

Dr Meinicke.

A 0,2 cc. de sérum actif soigneusement centrifugé, on ajoute 1 cc. d'une dilution d'extrait (extrait balsamique du Dr Meinicke) préparée avec une solution à 3 % de chlorure de sodium. Les tubes sont bien agités et laissés à la température de la chambre pendant une heure, puis le résultat est lu par l'observateur en tenant les tubes entre lui-même et une fenêtre bien éclairée. Un tube de contrôle avec formaline sert de terme de comparaison.

Suivant les indications de Meinicke, on a employé 2 extraits de concentration différente qui se complètent mutuellement au point de vue de leur activité. Les autres particularités techniques furent conformes à celles prescrites par le Dr Meinicke dans ses publications: « Deutsche Medizinische Wochenschrift », 1923, N° 2 et N° 19.

MM. Hirszfeld, Meinicke, Müller et Otto ont travaillé suivant ces prescriptions et ont utilisé les extraits préparés par M. Meinicke.

Dr Madsen (Assistant Moerch).

L'essai fut pratiqué suivant les indications du docteur Meinicke, mais, au lieu des extraits qu'il employait à Copenhague, on en a utilisé 2 autres, de plus grande sensibilité, reçus de Hagen quelque temps auparavant. Comme ces extraits n'avaient pour but que l'exécution d'une M.T.R. préliminaire destinée à séparer les « positifs » des « négatifs » en vue de l'examen ultérieur à la Sigmaréaction, on attribuait plus d'importance à leur sensibilité qu'à leur spécificité. Les résultats inscrits au tableau 2 ne peuvent, par conséquent, être comparés avec ceux des autres travailleurs. (Pour renforcer encore la sensibilité de la réaction, le Dr Meinicke introduisit une modification par laquelle la solution NaCl à 3 % était remplacée par du sulfate d'ammonium. Les résultats de ces essais ne sont pas inscrits dans les tableaux.)

A ces détails, il y a lieu d'ajouter les indications suivantes:

II. *S. G.* L'antigène était fourni et distribué par le Prof. Sachs personnellement. Dr Madsen utilisait le même extrait, mais qui lui avait été envoyé antérieurement de Heidelberg.

Tube 1 = 1 : 1.3
2 = 1 : 2.5
3 = 1 : 5
4 = 1 : 10
5 = 1 : 20

The dilutions of the antigens α and β were prepared by Assistant Moerch. The water-bath at 37° was *covered*; this important circumstance is, in my mind, the cause for the weak results I obtained in Copenhagen.

The tubes were immersed half to one-third.

Reading with microscope after 20 hours by the apparatus used in Copenhagen.

IV. **D. M. Test.**

Was carried out strictly according to the author's direction.

V. **M. T. R. Test.**

Dr. Meinicke.

To each tube containing 0.2 cc. active clear centrifugalised serum was added 1 cc. of a dilution of an extract prepared with 3 % NaCl solution (the balsam extract of Dr. Meinicke). The tubes were thoroughly shaken and left one hour at room temperature. When reading the results, the observer should hold the tubes between himself and a well-lighted window. For purposes of comparison, a tube containing exactly similar ingredients but with the addition of formalin was used. According to the directions of Meinicke, two extracts of different concentration were employed, which, as it were, acted as mutual controls. The other technical details were performed exactly according to the publications of Dr. Meinicke in the "Deutsche Medizinische Wochenschrift," 1923, Nos. 2 and 19.

Professors Hirszfeld, Meinicke, Müller and Otto worked in the manner set out above with the extracts of Dr. Meinicke.

Dr. Madsen (Assistant Moerch).

The test was performed according to the directions of Dr. Meinicke, but, instead of the extracts which he employed at the Conference, two others of greater sensitiveness were used which had been obtained from Hagen shortly before. As these extracts were intended for use only in a preliminary M.T.R. carried out with the object of separating "positives" from "negatives" for test by the Σ reaction more attention was paid to their sensitiveness than to their specificity. The results indicated in Table 2 are therefore not to be compared with those of the other investigators. To increase still further the sensitiveness of the test, a modification was introduced at the instance of Dr. Meinicke embodying the use of ammonium sulphate. The figures dealing with tests thus carried out are omitted from the tables.

To these technical details the following information must be added:

Ad. II. *S. G.* The antigen was brought and distributed by Professor Sachs personally. Dr. Madsen used some of the same extract, which had, however, been sent from Heidelberg previously.

Les dilutions de l'antigène étaient préparées par chaque travailleur pour son usage personnel.

III. Σ. — L'extrait avait été envoyé d'Oxford pour la Conférence; il était identique, comme sensibilité, avec un extrait provenant aussi d'Oxford et conservé à Copenhague avant la Conférence et avec un extrait apporté par le Dr Wyler. Les dilutions étaient faites pour tous les travailleurs, sauf le Dr Wyler, par M. l'assistant Moerch.

Tous les résultats des Sigmaréactions étaient lus après 22 heures.

IV. *D.M.* — La D.M. fut exécutée en se conformant strictement aux indications du Dr Meinicke.

V. *M.T.R.* — Voir ci-dessus *Technique*.

Signes utilisés dans les tableaux.

\# = réaction fortement positive = > 3,9 unités Sigma en 22 heures.
\+ = réaction faiblement positive = 1,5 à 3,9 unités Sigma en 22 heures.
± = réaction douteuse = 1,0 à 1,4 unité Sigma en 22 heures.
− = réaction négative = < 1,0 unité Sigma en 22 heures.
0 = la réaction n'a pas été pratiquée.

Le signe ± est interprété comme réaction positive dans les cas de syphilis avérée. Dans les cas sans diagnostic, il est interprété comme douteux et comme une indication pour répéter l'expérience sur un échantillon nouveau. Les signes « $-_1$ », « $-_2$ » indiquent que, en raison de la quantité insuffisante de sérum, le tube correspondant dans la Sigmaréaction n'a pas été exécuté. La marque «$\bullet^t$» dans les tableaux sous la rubrique «Diagnostic» indique que les cas de syphilis ont été traités.

Les diagnostics cliniques ne furent communiqués aux travailleurs qu'après transcription des résultats de leurs différents examens sérologiques.

The dilutions of the antigen were made by each investigator individually.

Ad. III. Σ. The extract was sent to the Conference from Oxford; it was found identical in sensitiveness both with an extract kept in Copenhagen obtained from Oxford before the Conference, and with a second brought by Dr. Wyler. The dilutions were made for all the investigators by Assistant Moerch except for Dr. Wyler. The Σ results were all read after 22 hours.

Ad. IV. *D.M.* D.M. was carried out strictly according to Dr. Meinicke's instructions.

Ad. V. *M.T.R.* See above under "Technique".

The *hieroglyphics* used in the tables:

## strong positive	$=>3.9$	Σ units in 22 hours
+ weak positive	$= 1.5—3.9$	„ „ „
± doubtful	$= 1.0—1.4$	„ „ „
− negative	$=<1.0$	„ „ „
0 test not done.		

The hieroglyphic ± is interpreted as positive in known cases of syphilis. In unknown cases it is interpreted as doubtful and as an indication for repetition of the test on a fresh specimen.

"$—_1$" "$—_2$" indicate that, because of insufficient quantities of serum, the respective tube in the Σ test was not used. The $\bullet^t$ in the tables under "Diagnosis" indicates that syphilitic cases had been treated.

The clinical diagnoses were communicated to the investigators only after they had handed in the results of the serological tests.

Tab. 2.

No.	B. W.							S. G.							Σ					D. M	
	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto
20/XI 1	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
2	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
3	##	##	±	##	##	##	##	##	##	##	##	##	##	##	##	##	+ 1.9	+	+ 1.8	± 1.3	##	##	##
4	0	−	−	−	−	−	−	−	0	−	−	−	−	−	−	−	0	−	−	−	0	−	0
5	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##>54	##	## 55	##>54	##	##	##
6	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
7	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
8	−	−	−	−	±	−	−	0	−	−	−	−	−	−	−	0	−1	−	−	0	0	−	−
9	±	−	±	−	±	±	−	−	−	−	−	−	−	0	−	−	−	−	−	−	−	−	−
10	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
11	−	−	−	−	−	±	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
12	−	−	−	−	−	±	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
13	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	## 15.5	##	## 13	## 27	##	##	##
14	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
15	−	−	−	−	−	−	−	−	−	−	−	0	−	−	−	−	−	−	−	−	−	−	−
16	.	.	−	.	.	.	.	.	.	.	−	.	.	.	.	.	. .	. .	−	.	.	−	.
17	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−1	−	−	−	−	−	0
18	##	##	##	##	##	##	##	##	##	+	+	0	##	##	+	0	. .	. .	## 13	.	.	−	0
19	−	−	−	−	−	−	±	−	##	±	−	−	−	−	−	−	−1	−	−	−	−	−	±
20	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
21	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
22	−	−	−	−	−	−	−	0	−	−	−	−	−	0	−	0	−	−	−	−	0	−	(
23	−	−	−	−	−	−	−	−	−	−	−	0	−	−	−	−	−	−	−	−	0	−	(
24	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	0	−	−
25	−	−	−	−	−	−	−	−	±	−	−	−	−	−	−	−	−1	−	−	−	±	−	(
26	+	##	−	##	##	##	##	+	+	−	±	0	−	+	±	+	−1	−	+ 1.5	± 1 3	−	##	−
27	−	−	−	−	±	±	+	−	##	−	−	0	−	±	−	−	−1	−	−	± 1.3	−	−	−
28	##	##	##	##	##	##	##	##	##	##	##	0	##	##	##	##	## 14.1	##	## 13.5	## 27	##	##	+
29	+	+	−	##	##	+	##	##	##	−	±	##	−	+	±	+	− 0.66	−	− 0.8	± 1.3	±	−	−
30	##	##	−	##	##	##	##	##	##	##	+	0	##	0	±	##	−1	+ 2.4	± 1.2	± 1.1	0	−	
31	−	−	±	##	−	−	−	−	−	−	−	±	−	−	−	−	−	−	−	−	±	−	−
32	##	##	##	##	##	##	##	##	##	##	##	0	##	##	+	##	+ 2.5	+ 3.4	+ 2.0	## 5.3	+	##	
33	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
34	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
35	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
36	−	−	−	−	−	−	−	−	−	−	−	−	−	0	−	−	−	−	−	−	−	−	

Tab. 2.

M. T. R.				Diagnosis													
				Syphilis							Control.						
Madsen	Müller	Otto	Meinicke	I	II	III	Lat.	Cong.	Tabes	D. p.	Tbc.	Grav.	Tumor	Mb. alii & sani	Observ.	No.
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Nephrosclerosis.	. . . .	1
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Apoplexia cerebri.	. . . .	2
++	++	++	++	.	.	.	.	.	.	●	.	.	.	. . .	. . . .	3
−	−	−	−	.	.	.	.	.	.	.	●	.	.	. . .	. . . .	4
++	++	++	++	.	.	●	.	.	.	.	.	.	.	. . .	. . . .	5
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Depressio mentis.	. . . .	6
−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . .	7
−	±	+	+	.	.	.	.	.	.	.	.	●	.	. . .	= No. 410.	8
−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . .	9
−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . .	10
−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . .	11
−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . .	12
+	++	++	++	.	.	.	.	.	.	.	.	●	.	. . .	= No. 345.	13
−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . .	14
−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . .	15
−	.	.	.	.	.	.	.	.	.	.	.	●	.	. . .	. . . .	16
−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . .	17
−	++	0	++	.	●	.	.	.	.	.	.	.	.	. . .	. . . .	18
−	−	−	−	●t	.	.	.	.	.	.	.	.	.	. . .	. . . .	19
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Gonorrh.	. . . .	20
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Sanus.	. . . .	21
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Ulcera venerea.	. . . .	22
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Sanus.	. . . .	23
−	−	−	−	.	●t	.	.	.	.	.	.	.	.	. . .	. . . .	24
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Ulcera venerea.	. . . .	25
−	++	++	++	.	.	●	.	.	.	.	.	.	.	. . .	. . . .	26
−	−	−	±	.	.	.	●	.	.	.	.	.	.	. . .	. . . .	27
−	++	++	++	.	.	.	.	●	.	.	.	.	.	. . .	. . . .	28
−	+	+	++	.	.	●t	.	.	.	.	.	.	.	. . .	. . . .	29
−	+	+	++	.	.	●t	.	.	.	.	.	.	.	. . .	. . . .	30
−	−	±	±	.	.	●t	.	.	.	.	.	.	.	. . .	. . . .	31
−	++	++	++	.	.	.	●	.	.	.	.	.	.	. . .	. . . .	32
−	−	−	−	.	.	.	.	.	.	.	●	.	.	Lymphom. colli.	. . . .	33
−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . .	34
−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . .	35
−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . .	36

Tab. 2.

No.	B. W.								S. G.								Σ					D. M.		
	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto	Müller
20/XI 37	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##>34	##	## 35	##>54	##	##	##	0
38	—	—	—	—	—	—	+	—	—	±	—	—	—	—	—	—	—	—	—	—	—	—	—	0
39	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0
40	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	## 6.8	##	## 5	## 5.3	##	##	##	0
21/XI 41	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
42	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—2	—	—	0	—	—	—
43	—	—	—	±	—	—	—	—	—	—	—	—	—	0	—	—	—1	—2	—	—	0	—	—	—
44	±	—	—	±	±	—	±	+	—	—	—	—	—	0	±	—	—1	—2	—	—	0	—	—	—
45	—	—	—	—	—	—	—	—	—	—	—	—	—	0	—	—	—1	—2	—	—	0	—	—	—
46	##	##	##	##	##	##	##	##	##	##	##	##	##	0	##	##	## 6.8	+ 3.7	## 5	## 13.4	##	##	##	+
47	—	—	+	—	—	—	—	—	0	0	—	—	0	0	0	0	—1	0	0	0	0	—	—	—
48	±	—	##	—	—	—	—	—	0	0	—	—	0	0	0	0	—1	0	0	0	0	—	—	—
49	—	—	—	—	—	—	—	—	0	—	—	—	—	0	—	—	—	—2	—	—	—	—	—	—
50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—2	—	—	—	—	—	—
51	—	—	—	—	—	—	—	±	0	—	—	—	—	0	—	—	—1	—2	—	—	0	—	—	—
52	—	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—	—1	—	—	0	—	—	—
53	—	—	—	—	—	—	—	—	0	—	—	—	—	0	—	—	—1	0	—	—	0	—	—	—
54	—	—	—	—	—	—	—	—	0	—	—	—	—	0	—	—	—	—	—	—	0	—	—	—
55	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
56	±	—	—	—	—	±	—	—	—	—	—	—	—	—	±	—	—1	—	—	—	—	—	—	—
57	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—1	—	—	—	—	—	—	—
58	—	—	—	±	—	—	±	—	—	—	—	—	—	—	—	—	— 0.66	—	—	± 1.3	—	—	—	—
59	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
60	—	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—
61	±	—	—	—	—	±	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
62	##	##	##	##	##	0	##	0	##	##	##	##	##	0	##	##	## 6 2	+ 2.3	+ 1.6	± 1.1	±	##	—	±
63	—	—	—	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
64	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##>34	##>22	##>25	## 44	##	##	##	##
65	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	—	—	—	—	0	—	—	—	—
22/XI 66	—	—	—	+	—	—	—	—	±	—	—	—	—	—	—	—	— 0.53	—	— 0.7	—	—	+	—	—
67	.	.	—	.	.	.	.	.	.	.	—	.	.	.	.	.	.	.	—	.	.	—	—	—
68	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
69	##	##	±	##	##	##	##	##	##	##	##	##	+	##	+	##	+ 2.5	## 6.4	+ 2.5	± 1.3	##	+	—	##
70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
71	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	## 14	## 30	##>54	##	##	##	##
72	##	±	+	##	##	##	##	##	##	±	+	##	+	±	+	##	+ 1.9	+ 2.8	+ 3.8	+ 3.8	+	+	+	+

Tab. 2.

M. T. R.				Diagnosis													
				Syphilis							Control.						
Madsen	Muller	Otto	Meinicke	I	II	III	Lat.	Cong.	Tabes	D. p.	Tbc.	Grav.	Tumor	Mb.alii & sam	Observ.	No.
++	++	++	++	.	.	.	.	.	.	.	.	●	.	. . .	. . . . .	37
−	−	−	±	.	.	.	.	.	.	.	.	●	.	. . .	0 Syphilis.	38
−	−	−	±	.	.	.	.	.	.	.	.	●	.	. . .	0 Syphilis.	39
++	++	++	++	.	.	.	●	.	.	.	.	●	.	partus.	. . . .	40
−	−	−	−	.	.	.	.	.	.	.	●	.	.	. . .	. . . .	41
−	−	−	±	.	.	.	.	.	.	.	●	.	.	. . .	. . . .	42
−	−	0	−	.	.	.	.	.	.	.	●	.	.	. . .	. . . .	43
+	−	−	−	.	.	.	.	.	.	.	.	.	.	Neurosis. Climakterium).	Pupillæ parve irregulär. = No. 461.	44
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Endocarditis.	. . . .	45
++	++	++	++	.	.	●	.	.	.	.	.	.	.	Apoplexia cerebri.	. . . .	46
±	0	0	0	.	.	.	●?	.	.	.	.	.	.	Dem. alcoholica.	B. W. Liq. cerebrosp +	47
±	0	0	0	.	.	.	.	.	.	●	.	.	.	. . .	. . . .	48
−	−	−	−	.	.	.	.	.	.	.	●	.	.	Empyema pulm.	. . . .	49
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Morb. ventriculi.	. . . .	50
−	−	0	−	.	.	.	.	.	.	.	.	.	.	Leucæmia.	. . . .	51
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Bronchit. acuta.	. . . .	52
−	−	0	−	.	.	.	.	.	.	.	.	.	.	Broncho pneumon.	. . . .	53
−	−	−	−	.	.	.	.	.	.	.	.	.	●?	Achylia.	. . . .	54
.	.	.	.	.	.	.	.	.	.	.	.	.	.	. . .	. . . .	55
±	−	−	±	.	●t	.	.	.	.	.	.	.	.	. . .	. . . .	56
−	−	−	−	.	●t	.	.	.	.	.	.	.	.	. . .	. . . .	57
−	−	−	−	.	.	●t	.	.	.	.	.	.	.	. . .	. . . .	58
−	−	−	−	.	.	.	●t	.	.	.	.	.	.	. . .	Syphilis sanata.?	59
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Ulcera venerea.	. . . .	60
−	−	−	−	●t	.	.	.	.	.	.	.	.	.	. . .	. . . .	61
+	++	++	++	.	●t	.	.	.	.	.	.	.	.	. . .	. . . .	62
−	−	−	−	.	.	●t	.	.	.	.	.	.	.	. . .	. . . .	63
+	++	++	++	●t	.	.	.	.	.	.	.	.	.	. . .	. . . .	64
-	−	−	−	.	●t	.	.	.	.	.	.	.	.	. . .	. . . .	65
-	−	−	−	.	●t	.	.	.	.	.	.	.	.	. . .	. . . .	66
-	.	.	.	.	.	.	.	.	.	.	.	.	.	Scarlatina.	. . . .	67
-	−	−	−	.	.	.	.	.	.	.	.	.	.	Varicellæ.	. . . .	68
-	+	++	++	.	.	.	●t	.	.	.	.	.	.	. . .	. . . .	69
-	−	−	−	.	.	.	.	.	.	.	●	.	.	Spondylitis.	. . . .	70
-	++	++	++	.	.	●t	.	.	.	.	.	.	.	. . .	. . . .	71
-	+	−−	+	.	.	●t	.	.	.	.	.	.	.	. . .	. . . .	72

Tab. 2.

No.	B. W.								S. G.								Σ					D. M.		
	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto	Müller
22/XI 73	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
75	±	±	±	±	±	±	±	±	±	±	±	±	±	±	±	±	± 16.6	± 9.4	± 30	±>54	±	±	.	±
76	±	±	—	±	±	—	±	+	0	+	+	±	±	+	+	±	— 0.75	+ 1.8	+ 1.8	+ 2.5	0	—	±	±
77	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
78	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	— 0.53	—	—	—	—	—	.	—
79	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
80	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
81	.	.	±	.	.	.	.	.	.	.	+	.	.	.	.	.	. .	. .	+ 3.6	. .	.	±	.	.
82	—	—	—	—	—	—	—	—	0	—	0	0	—	0	—	—	—	—	—	—	0	0	.	—
83	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
84	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
85	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
86	—	—	—	—	—	0	—	—	0	—	—	—	—	0	—	—	— 0.66	—	—	—1	0	—	.	—
87	—	—	—	—	—	—	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—	.	—
88	—	—	—	—	—	0	—	—	0	—	—	—	—	0	—	—	—1	—	—	—1	0	—	.	—
89	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
90	—	—	—	—	—	—	—	—	0	—	—	—	—	0	—	—	—	—	—	—	—	—	.	—
91	—	0	—	—	0	0	0	—	—	0	—	0	0	0	0	—	—	0	—	—	—	—	.	0
92	0	0	—	—	0	0	0	—	0	0	—	—	0	0	0	0	0	0	—	0	0	—	.	0
93	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	—	—	—	±	—	.	—
94	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
95	—	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	0	—	—	—	—	—	.	—
96	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
97	—	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
98	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
99	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
100	±	—	±	±	±	—	+	±	+	—	—	—	—	—	—	—	— 0.66	—	—	—	—	—	.	±
101	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
102	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
103	±	±	±	±	±	±	±	±	±	±	±	±	±	±	±	±	± 6.8	± 6.2	± 13	± 13.4	±	±	.	±
104	±	±	—	±	±	±	±	±	0	±	±	—	±	0	+	±	0	+ 2.5	+ 2.5	+ 2.5	+	±	.	±
105	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
106	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
107	—	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—	—	—	—	—	—	.	—
108	—	—	—	—	0	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—	—	—	—

Tab. 2.

M. T. R.				Diagnosis															
				Syphilis							Control.							No.
Madsen	Müller	Otto	Meinicke	I	II	III	Lat.	Cong.	Tabes	D. p.	Tbc.	Grav.	Tumor	Mb. alii & sani	Observ.				
—	—	—	—	.	.	.	.	.	.	.	●	.	.	Lymphom. colli.	.	.	.	.	73
—	—	—	—	.	.	.	.	.	.	.	●	.	.	Lymphom. colli.	.	.	.	.	74
++	++	++	++	.	.	●t	.	.	.	.	.	.	.	.	.	.	.	.	75
++	++	+	++	.	.	●t	.	.	.	.	.	.	.	.	.	.	.	.	76
—	—	—	—	.	.	.	.	.	.	.	●	.	.	Lupus vulg.	.	.	.	.	77
—	—	—	—	.	.	.	●t	.	.	.	.	.	.	.	Syphilis sanata?				78
—	—	—	—	.	.	.	.	.	.	.	●	.	.	Lymphom. colli.	.	.	.	.	79
—	—	—	—	.	.	.	.	.	.	.	.	.	.	Myxoedema.	.	.	.	.	80
++	.	.	.	.	.	●t	.	.	.	.	.	.	.	.	.	.	.	.	81
—	—	0	—	.	.	.	.	.	.	.	.	●	.	.	.	.	.	.	82
—	—	—	—	.	.	.	.	.	.	.	.	●	.	.	.	.	.	.	83
—	—	—	—	.	.	.	.	.	.	.	.	●	.	Abortus	.	.	.	.	84
—	—	—	—	.	.	.	.	.	.	.	.	●	.	.	.	.	.	.	85
—	—	—	—	.	.	.	.	.	.	.	.	●	.	.	.	.	.	.	86
—	—	—	—	.	.	.	.	.	.	.	.	●	.	.	.	.	.	.	87
—	—	—	—	.	.	.	.	.	.	.	.	●	.	.	.	.	.	.	88
—	—	—	—	.	.	.	.	.	.	.	.	●	.	.	.	.	.	.	89
—	—	—	—	.	.	.	.	.	.	.	●	.	.	.	.	.	.	.	90
—	0	0	0	.	.	.	.	.	.	.	●	.	.	.	.	.	.	.	91
—	0	0	0	.	.	.	.	.	.	.	●	.	.	.	.	.	.	.	92
—	—	—	—	.	.	.	.	.	.	.	.	.	.	Gonorrh.	.	.	.	.	93
—	—	—	—	.	.	.	.	.	.	.	.	●	.	.	Pupillæ lente reagent.				94
—	—	—	—	.	.	.	.	.	.	.	.	●	.	.	.	.	.	.	95
—	—	—	—	.	.	.	.	.	.	.	.	●	.	.	.	.	.	.	96
—	—	—	—	.	.	.	.	.	.	.	.	●	.	.	.	.	.	.	97
—	—	—	—	.	.	.	.	.	.	.	.	●	.	.	Partus 1—1½ Mens. pro tempore calculat.				98
—	—	—	—	.	.	.	.	.	.	.	.	●	.	.	VI-para. II Abort.				99
—	—	—	—	.	.	.	.	●t	.	.	.	●	.	.	.	.	.	.	100
—	—	—	—	.	.	.	.	.	.	.	.	●	.	.	.	.	.	.	101
—	—	—	—	.	.	.	.	.	.	.	.	●	.	.	B. W. $^{19}/_{11}$ 23. ±				102
++	++	++	++	.	.	●t	.	.	.	.	.	.	.	.	.	.	.	.	103
++	++	+	++	.	.	●t	.	.	.	.	.	.	.	.	.	.	.	.	104
—	—	—	—	.	.	.	.	.	.	.	.	.	.	Ulcus cruris.	.	.	.	.	105
—	—	—	—	.	.	.	.	.	.	.	●	.	.	Lupus vulgaris.	.	.	.	.	106
—	—	—	—	.	.	.	.	.	.	.	.	.	.	Ulcus cruris.	.	.	.	.	107
—	0	—	—	.	.	.	.	.	.	.	●	.	.	Lupus vulgaris	.	.	.	.	108

Tab. 2.

No.	B. W.								S. G.								Σ					D. M.		
	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto	Müller
22/XI 109	−	−	−	−	0	−	−	−	−	−	−	0	0	0	−	−	−1	−	−	−	−	−	0	−
110	−	−	−	−	0	−	−	−	0	−	−	0	0	0	−	−	−1	−	−	−	−	−	0	−
111	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	0	−
23/XI 112	++	++	++	++	++	++	++	++	0	++	+	.	++	++	++	++	−1	± 1.4	+ 2.5	0	+	++	0	+
113	.	.	−	++	.	.	.	.	.	.	−	.	.	.	.	.	.	.	−	.	.	−	.	.
114	++	++	++	++	++	++	++	++	0	++	++	.	+	0	++	++	+ 1.5	+ 2.6	+ 2	+ 3.2	+	±	0	+
115	−	−	−	−	−	−	−	−	0	−	−	.	−	0	−	−	−	−	−	−	0	−	0	−
116	−	−	−	−	−	−	−	−	−	−	−	.	−	−	−	−	−	−	−	−	−	−	−	−
117	++	++	++	++	++	++	++	++	++	++	++	.	++	++	++	++	+ 3.9	++ 6.2	++ 10	++ 27	++	++	++	++
118	−	−	−	−	−	−	−	−	0	−	−	.	−	0	−	−	0	−	−	−	0	−	0	−
119	−	−	−	−	−	−	−	−	−	−	−	.	−	−	−	−	−	−	−	−	−	−	−	−
120	++	++	++	++	++	++	++	++	++	++	++	.	++	+	++	++	++>5.1	++ 11.5	++ 13	++>54	++	++	++	++
121	±	+	−	−	++	−	−	±	+	−	+	.	−	+	−	+	− 0.66	−	+ 1.6	−	±	±	0	−
122	−	−	−	−	−	−	−	−	0	−	−	.	−	0	−	−	−1	−	−	−	−	−	0	−
123	0	0	+	++	0	0	0	0	0	0	+	.	0	0	0	0	0	0	+ 2	0	0	−	0	0
124	−	−	−	−	−	−	−	−	0	−	−	.	−	−	−	−	−1	−	−	−	−	−	−	−
125	−	−	−	−	−	−	−	−	0	−	−	.	−	−	−	−	−1	−	−	−	−	−	0	−
126	−	−	−	−	−	−	−	−	−	−	−	.	−	−	−	−	−	−	−	−	−	−	−	−
127	.	.	−	.	.	.	.	.	.	.	−	.	.	.	.	.	.	.	−	.	.	−	.	.
128	.	.	−	.	.	.	.	.	.	.	±	.	.	.	.	.	.	.	−	.	.	±	.	.
129	++	++	+	++	++	−	−	+	++	±	+	.	−	+	−	+	− 0.75	−	+ 1.5	−	±	±	±	−
130	++	++	++	++	++	++	++	++	++	++	++	.	++	++	++	++	++>54	++>12	++>100	++ 27	++	++	++	++
131	−	−	−	−	±	−	−	−	0	−	±	.	−	−	−	−	−	−	−	−	−	±	−	−
132	−	−	−	−	−	−	−	−	−	−	−	.	−	−	−	−	−	−	−	−	−	−	±	−
133	−	−	−	−	−	−	−	−	−	−	−	.	−	−	−	−	−	−	−	−	−	−	−	−
134	−	−	−	−	−	−	−	−	0	−	−	.	−	.	−	−	−	−	−	−	−	−	.	−
135	−	−	−	−	−	−	−	−	−	−	−	.	−	−	−	−	−	−	−	−	±	−	−	−
136	−	−	−	−	−	−	−	−	0	−	−	.	−	−	−	−	−1	−	−	−	-	−	−	−
137	−	−	−	−	−	−	−	−	0	−	−	.	−	0	−	−	−1	−	−	−1	−	−	.	−
138	++	++	±	++	++	±	++	++	0	++	++	.	++	0	+	++	+ 2.5	+ 3	++ 4.5	+ 2.2	+	±	.	+
139	−	−	−	−	−	−	−	−	−	−	−	.	−	−	−	−	−	−	−	−	−	−	−	−
140	−	−	−	−	−	−	−	−	−	−	−	.	−	−	−	−	−	−	−	?	−	−	−	−
141	−	−	−	−	−	−	−	−	0	−	−	.	−	0	−	−	− 0.89	−	−	± 1.1	0	−	.	−
142	++	++	+	++	++	−	++	+	++	−	±	.	+	+	±	+	−1	−	+ 1.8	± 1.3	±	−	+	−
143	++	++	++	++	++	+	+	±	++	+	+	.	±	±	−	+	+ 3.2	+ 3.4	+ 2.5	++ 13.4	+	−	±	±
144	−	−	−	−	−	−	−	−	0	−	−	.	−	0	−	−	0	−	−	−1	0	−	.	−

Tab. 2.

M. T. R.				Diagnosis													
				Syphilis							Control.						
Madsen	Müller	Otto	Meinicke	I	II	III	Lat.	Cong.	Tabes	D. p.	Tbc.	Grav.	Tumor	Mb.alii & sani	Observ.	No.
−	0	−	−	.	.	.	.	.	.	.	.	.	●	. . .	. . . . .	109
−	0	−	−	.	.	.	.	.	●	.	.	.	.	. . .	. . . . .	110
−	−	−	±	.	.	.	.	.	.	.	.	.	●	. . .	. . . . .	111
++	+	+	++	.	.	●t	.	.	.	.	.	.	.	. . .	. . . . .	112
−	.	.	.	.	.	.	.	.	.	.	.	.	.	Lumbago	. . . . .	113
++	++	++	++	.	.	●t	.	.	.	.	.	.	.	Aneur. aortæ.	. . . . .	114
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Alcoh. chr.	. . . . .	115
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Ulcus ventr. ÷ Refl. patell.	. . . . .	116
++	++	++	++	.	.	.	.	.	.	●	.	.	.	. . .	. . . . .	117
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Mb.cord.aortæ. Aneurisma?	. . . . .	118
−	−	−	−	.	.	.	.	.	.	●?	.	.	.	. . .	Syphilis 1900?	119
++	++	++	++	.	.	.	.	.	.	●	.	.	.	. . .	Syphilis 1893.	120
+	+	−	±	.	.	.	●t	.	.	.	.	.	.	. . .	Syphilis 1893. B. W. + 25/9 1923.	121
−	−	−	−	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .	122
++	0	0	0	.	.	.	●	.	.	.	●	.	.	. . .	. . . . .	123
−	−	−	−	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .	124
−	−	−	−	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .	125
−	−	−	−	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .	126
−	.	.	.	.	.	.	.	.	.	.	.	.	.	Scarlatina.	. . . . .	127
−	.	.	.	.	.	.	.	.	.	.	.	.	.	Scarlatina.	. . . . .	128
−	−	−	−	.	.	.	●t	.	.	.	.	.	.	. . .	. . . . .	129
++	++	++	++	.	.	.	●	.	.	.	.	.	.	. . .	. . . . .	130
−	±	−	−	.	.	.	.	.	.	.	●	.	.	Lymphom. colli.	. . . . .	131
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Ulcus cruris.	. . . . .	132
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Ulcus cruris.	. . . . .	133
−	−	−	−	●t	.	.	.	.	.	.	.	.	.	. . .	. . . . .	134
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Gonorrh.	. . . . .	135
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Balanopost.	. . . . .	136
−	−	−	−	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	137
++	++	+	++	.	.	●t	.	.	.	.	.	.	.	. . .	. . . . .	138
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Psoriasis.	. . . . .	139
−	−	−	−	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	140
−	−	−	−	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	141
+	+	±	±	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	142
++	++	+	±	●t	.	.	.	.	.	.	.	.	.	. . .	+ Sp. pall.	143
−	−	−	−	.	.	.	.	.	.	●t	.	.	.	. . .	. . . . .	144

Tab. 2.

No.	B, W.								S. G.								Σ					D. M.			
	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto	Müller	Matrizlab.
23/XI 145	⋕	⋕	+	+	⋕	±	±	+	⋕	−	+	.	+	+	±	⋕	− 0.89	−	+ 1.6	± 1.1	0	−	+	+	−
146	⋕	⋕	⋕	⋕	⋕	⋕	⋕	⋕	0	⋕	⋕	.	⋕	⋕	⋕	⋕	+ 3.0	⋕ 5.5	⋕ 5	⋕ 13.4	⋕	+	+	+	⋕
147	⋕	⋕	⋕	⋕	⋕	⋕	⋕	⋕	0	±	+	.	±	0	+	⋕	−	−	+ 1.5	−	+	±	0	⋕	⋕
148	−	−	−	−	−	−	−	−	0	−	−	.	−	−	−	−	−	−	−	−	−	−	−	−	−
24/XI 149	−	−	−	−	−	−	−	−	0	−	−	.	−	−	−	−	−1	−	−	−	.	−	.	−	−
150	−	−	−	−	−	−	−	−	0	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−	−
151	−	−	−	−	−	−	−	−	−	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−	−
152	−	−	−	−	−	±	−	−	−	−	−	.	−	−	−	−	−	−	−	−	.	−	.	−	−
153	−	−	−	−	−	−	−	−	0	−	−	.	−	0	−	−	−	−	−	−	.	−	.	−	−
154	−	−	−	−	±	−	−	−	0	−	+	.	−	−	±	−	− 0.75	−	⊹ 1.8	−	.	−	.	−	−
155	.	.	−	.	.	.	.	.	.	.	−	.	.	.	.	.	. .	. .	−	. .	.	−	.	.	−
156	−	−	−	−	−	−	−	−	−	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−	−
157	−	−	−	−	−	−	−	−	0	−	−	.	−	0	−	−	0	0	−	−	.	−	.	−	−
158	+	±	−	⋕	+	±	⋕	⋕	0	−	+	.	−	0	±	±	−	−	−	−	.	−	.	±	−
159	−	−	−	⋕	−	−	−	−	0	−	−	.	−	0	−	−	−	−	−	−	.	−	.	−	−
160	−	−	−	−	−	−	−	−	0	−	−	.	−	−	−	−	−	−1	−	−	.	−	.	−	−
161	−	−	−	−	−	−	−	−	0	−	−	.	−	0	−	−	−	−	−	−	.	−	.	−	−
162	±	⋕	⋕	⋕	⋕	±	+	±	0	+	+	.	+	0	+	+	0	−	+ 3	± 1.3	.	−	.	+	−
163	−	−	−	−	−	−	−	−	0	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−	−
164	−	−	−	−	−	−	−	−	0	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−	−
165	.	.	−	.	.	.	.	.	.	.	−	.	.	.	.	.	. .	. .	−	. .	.	−	.	.	−
166	−	−	−	+	−	0	−	−	−	−	−	.	−	0	−	−	−	−	−	−	.	−	.	−	−
167	−	−	−	−	−	−	−	−	0	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−	−
168	−	−	−	−	−	−	−	−	−	−	−	.	0	−	−	−	−	−	−	−	.	−	0	−	−
169	−	−	−	−	−	−	−	−	−	−	−	.	−	−	−	−	−	−	−	−	.	−	0	−	−
170	−	−	±	±	−	−	−	−	0	−	±	.	−	−	−	−	− 0.75	−	⊹ 1.5	−	.	−	0	−	−
171	−	−	−	−	−	−	−	−	−	−	±	.	−	−	−	−	−	−	−	−	.	−	−	−	−
172	−	−	−	⋕	±	−	−	−	+	−	±	.	−	0	−	−	− 0.89	−	−	−	.	−	0	−	−
173	−	−	−	−	−	−	−	−	−	−	−	.	−	0	−	−	− 0.66	−	−	−	.	−	0	−	−
174	.	.	−	.	.	−	.	.	.	.	−	.	.	.	.	.	. .	. .	−	. .	.	−	.	.	−
175	+	⋕	±	⋕	+	±	⋕	±	0	−	±	.	−	0	−	−	+ 1.6	−2	+ 2.5	⊹ 11.3	.	−	0	−	−
176	−	−	−	−	−	−	−	−	0	−	−	.	−	−	−	−	−	−	−	−	.	−	0	−	−
177	−	−	−	−	−	−	−	−	0	−	−	.	−	−	−	−	−1	−2	−	0	.	−	0	−	−
178	−	−	−	−	−	−	−	−	0	−	−	.	−	−	−	−	0	−	−	−	.	−	0	−	−
179	−	−	−	−	−	−	−	−	0	−	−	.	−	−	−	−	−	−1	−	−	.	−	0	−	−
180	−	−	−	−	−	−	−	−	0	−	−	.	−	0	−	−	0	−	−	−	.	−	0	−	−

Tab. 2.

M. T. R.				Diagnosis																	
				Syphilis							Control.										
Madsen	Müller	Otto	Meinicke	I	II	III	Lat.	Cong.	Tabes	D. p.	Tbc.	Grav.	Tumor	Mb. alii & sani	Observ.	No.
+	++	−	±	.	.	.	.	.	.	●	.	.	.	. . .	. . . . .	145
++	++	++	++	.	.	.	.	.	●	●t	.	.	.	. . .	Malaria tract.	146
+	++	±	±	.	.	.	.	.	.	●t	.	.	.	. . .	. . . . .	147
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Dement. juvenil.	. . . . .	148
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Angina tonsil.	. . . . .	149
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Angina tonsil.	. . . . .	150
−	−	−	−	.	.	.	.	.	.	.	.	.	●	. . .	. . . . .	151
−	−	−	−	.	.	.	.	.	.	.	.	.	●	. . .	. . . . .	152
−	−	−	−	.	.	.	.	.	.	.	.	.	●	. . .	. . . . .	153
−	−	−	−	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	154
−	.	.	.	.	.	.	.	.	.	.	.	.	.	Scarlatina.	. . . . .	155
−	−	−	−	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	156
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Diphtheria.	. . . . .	157
−	±	−	±	.	.	.	●t	.	.	.	.	.	.	. . .	. . . . .	158
−	+	−	±	.	.	.	●t	.	.	.	.	.	.	. . .	Syphilis sanata?	159
−	−	−	−	.	.	.	●t	.	.	.	.	.	.	. . .	. . . . .	160
−	−	−	−	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	161
−	+	++	+	.	.	.	●t	.	.	.	.	.	.	. . .	. . . . .	162
−	−	−	−	.	.	.	●t	.	.	.	.	.	.	. . .	. . . . .	163
−	−	−	−	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	164
±	.	.	.	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	165
−	−	−	−	.	.	.	●t	.	.	.	.	.	.	. . .	. . . . .	166
−	−	−	−	.	.	.	●t	.	.	.	.	.	.	. . .	Syphilis sanata?	167
−	−	−	−	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	168
−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	Abort.	169
+	−	−	−	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	170
−	−	−	−	●t	.	.	.	.	.	.	.	.	.	. . .	+ Sp pall.	171
−	±	±	±	.	.	●t	.	.	.	.	.	.	.	. . .	. . . . .	172
−	−	−	−	●t	.	.	.	.	.	.	.	.	.	. . .	. . . . .	173
−	.	.	.	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	174
±	−	−	±	●t	.	.	.	.	.	.	.	.	.	. . .	+ Sp. pall	175
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Condylomata.	. . . . .	176
−	−	0	0	.	.	.	.	.	.	.	.	.	.	Nephro-sclerosis.	4 Abort.	177
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Hypertensio.	. . . . .	178
−	−	−	−	.	.	.	.	.	.	.	.	.	●	. . .	C. ventriculi & hepatis. Icterus.	179
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Adipositas.	. . . . .	180

Tab. 2.

No.	B. W.								S. G.								Σ					D. M.		
	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto	Müller
24/XI 181	—	—	—	—	—	—	—	—	0	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—
182	—	—	—	+	—	—	—	—	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—
183	—	—	—	—	—	—	—	—	0	—	—	.	—	—	—	—	0	—	—	—	.	—	—	—
184	—	—	—	—	—	—	—	—	0	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—
185	—	—	—	—	—	—	—	—	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—
186	—	—	—	—	—	—	—	—	0	—	—	.	—	—	—	—	— 0.89	—	—	—	.	—	0	—
187	—	—	—	—	—	—	—	—	0	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—
188	—	—	—	—	—	—	—	—	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—
189	—	—	—	—	—	—	—	—	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—
190	—	—	—	—	—	—	—	—	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—
191	—	—	—	—	—	—	—	—	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—
192	—	—	—	—	—	—	—	—	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—
193	—	—	—	—	—	—	—	—	0	—	—	.	—	—	—	—	—1	—2	—	—	.	—	0	—
194	.	.	—	.	.	.	.	.	.	.	—	.	.	.	.	.	. .	. .	—	. .	.	—	.	.
195	—	—	—	—	—	—	—	—	0	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—
196	.	.	±	.	.	.	.	.	.	.	±	.	.	.	.	.	. .	. .	±>4	. .	.	+	.	.
197	—	—	—	—	—	—	—	—	0	—	±	.	—	0	—	—	—	—	—	—	.	±	0	±
198	—	—	—	—	—	—	—	—	0	—	—	.	—	—	—	—	— 0.75	—	—	—	.	—	—	—
199	.	.	—	.	.	.	.	.	.	.	—	.	.	.	.	.	. .	. .	—	. .	.	—	.	.
200	.	.	—	.	.	.	.	.	.	.	—	.	.	.	.	.	. .	. .	—	. .	.	—	.	.
201	0	—	—	—	—	—	—	—	0	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—
202	0	—	—	—	—	—	—	—	—	—	—	.	—	0	—	—	—	—	—	—	.	—	—	—
203	0	—	—	—	—	—	—	—	—	—	—	.	—	0	—	—	— 0.53	—	—	—	.	—	—	—
204	0	—	—	—	—	—	—	—	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—
205	0	—	—	—	—	—	—	—	0	—	+	.	—	0	—	—	—	0	± 1.2	—	.	—	0	—
206	0	±	±	±	±	±	±	±	±	±	±	.	±	±	±	±	+ 3.2	+ 2.75	+ 3.2	± 5.3	.	—	+	±
207	0	—	—	—	—	—	—	—	0	—	—	.	—	—	—	—	—1	—	—	—	.	—	—	—
208	0	—	—	—	—	—	—	—	—	—	—	.	—	—	—	—	— 0.89	—	—	—	.	—	—	—
209	0	—	—	—	—	—	—	—	0	—	—	.	—	—	—	—	—1	—	—	—	.	—	—	—
210	0	—	—	—	—	—	—	—	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—
211	0	—	—	—	—	—	—	—	0	—	—	.	—	—	—	—	0	—	—	—	.	—	—	—
212	0	—	—	—	—	—	—	—	—	—	—	.	—	—	—	—	— 0.66	—	—	—	.	—	—	—
213	.	.	—	.	.	.	.	.	.	.	±	.	.	.	.	.	. .	. .	—	. .	.	—	.	.
214	0	—	—	—	—	—	—	—	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—
215	0	—	—	—	—	—	—	—	0	—	—	.	—	—	—	—	— 0.75	—	—	—	.	—	—	—
216	0	±	±	±	±	±	±	±	±	±	±	.	±	±	±	±	±>34	±>22	± 12	±>10.7	.	±	±	±

Tab. 2.

| M. T. R. | | | | | Diagnosis | | | | |

Tab. 2.

	No.	B. W.								S. G.								Σ					D. M.			
		Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto	Müller	Meinicke
24/XI	217	0	##	##	##	##	+	##	##	0	+	##	.	##	##	+	##	+ 1.8	+ 1.8	## 10	##>17	.	##	+	##	##
	218	0	##	##	##	##	##	##	##	0	##	##	.	##	0	##	##	## 7.0	## 6	##> 5	##>25	.	##	0	##	##
26/XI	219	0	##	+	##	##	##	##	.	0	0	+	.	0	0	0	##	0	## 7 1	##> 5	0	.	—	0	0	0
	220	0	##	—	##	+	##	##	.	.	0	—	.	0	0	0	+	0	+ 3	+ 2.5	0	.	—	0	0	0
	221	##	##	##	##	##	##	##	.	0	##	+	.	+	+	+	##	## 7.8	## 7 1	## 5	##>23	.	±	+	##	+
	222	##	##	##	##	##	+	##	.	##	##	##	.	##	##	##	##	##>54	##>50	## 25	##>27	.	##	##	##	##
	223	##	##	+	##	##	—	+	.	+	+	—	.	+	0	—	—	— 0.53	—	—	—	.	—	0	+	##
	224	0	##	##	##	##	##	##	.	.	0	##	.	0	0	0	##	0	## 15	##> 5	0	.	—	0	0	0
	225	0	—	—	—	—	—	—	.	.	—	—	.	—	—	—	—	0	—	—	—	.	—	—	—	—
	226	##	##	±	##	##	±	##	.	0	+	+	.	+	—	±	±	—	—	—	—	.	—	—	+	—
	227	.	.	—	.	.	.	.	.	.	.	—	.	.	.	.	.	.	.	—	.	.	—	.	.	.
	228	—	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—	—
	229	—	±	—	—	±	0	—	.	—	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—	—
	230	—	—	—	—	—	—	—	.	—	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—	—
	231	—	±	—	—	—	—	—	.	0	—	—	.	—	0	—	—	— 0 75	—	—	—	.	—	0	—	—
	232	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
	233	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
	234	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
	235	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—	—
	236	—	—	—	—	—	—	—	.	—	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—	±
	237	—	—	—	—	—	—	—	.	—	—	—	.	0	0	—	—	—	—	—	—	.	—	0	0	—
	238	+	##	—	+	+	—	+	.	+	##	+	.	+	±	+	+	+ 3 2	+ 3.2	+ 1.6	+ 1.5	.	—	±	+	±
	239	##	##	##	##	##	##	##	.	0	##	##	.	##	##	##	##	0	## 5 0	+ 2.5	—	.	##	##	##	+
	240	±	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
	241	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
	242	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
	243	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
	244	±	—	—	—	—	—	—	.	—	—	—	.	—	0	—	—	— 0 66	—	—	—	.	—	0	—	—
	245	±	±	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
	246	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
	247	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
	248	—	—	—	±	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
	249	##	##	##	##	##	##	##	.	##	##	##	.	##	0	##	##	—	+ 2.8	##>25	##>23	.	##	0	##	
	250	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	
	251	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	
	252	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	

Tab. 2.

M. T. R.				Diagnosis													
				Syphilis							Control.						
Madsen	Müller	Otto	Meinicke	I	II	III	Lat.	Cong.	Tabes	D. p.	Tbc.	Grav.	Tumor	Mb. alii & sani	Observ.	No.
±	±	±	±	.	$\bullet^t$	.	.	.	.	.	.	.	.	. . .	. . . . .	217
±	±	±	±	.	.	.	$\bullet$	.	.	.	.	.	.	. . .	. . . . .	218
±	±	0	±	.	.	.	.	.	.	$\bullet$	.	.	.	. . .	. . . . .	219
−	0	0	±	.	.	.	.	.	.	$\bullet$	.	.	.	. . .	. . . . .	220
+	+	±	±	.	.	.	.	.	.	$\bullet$	.	.	.	. . .	. . . . .	221
±	±	±	±	.	.	.	.	.	.	$\bullet$	.	.	.	. . .	7/XI Malaria inoc.	222
+	+	−	±	.	.	.	.	.	.	$\bullet$	.	.	.	. . .	Aug. Malaria tract.	223
+	±	0	+	.	.	.	.	.	.	$\bullet$	.	.	.	. . .	. . . . .	224
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Dementia praecox simplex.	. . . . .	225
+	+	−	±	.	.	.	.	.	.	$\bullet$	.	.	.	. . .	15/IX Malaria tract.	226
−	.	.	.	.	.	.	.	.	.	.	.	.	.	Bronchitis.	. . . . .	227
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Angina pectoris.	. . . . .	228
±	−	−	−	.	.	.	.	.	.	.	.	.	.	Bronchitis Emphysem pulm.	0 Syph.	229
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Nephrosclerosis.	. . . . .	230
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Nephritis acuta.	0 Syph.	231
−	−	−	−	.	.	.	.	.	.	.	$\bullet$	.	.	. . .	Lupus erythemat.	232
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Acne cheloidea.	. . . . .	233
−	−	−	−	.	.	$\bullet^t$	.	.	.	.	.	.	.	. . .	. . . . .	234
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Ulcus cruris.	. . . . .	235
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Ulcus cruris.	B. W. 16/10 23 +	236
±	±	−	−	.	.	.	$\bullet^t$	.	.	.	.	.	.	. . .	. . . . .	237
+	+	−	±	.	.	.	$\bullet$	.	.	.	.	.	.	. . .	. . . . .	238
±	±	±	±	.	.	$\bullet^t$	.	.	.	.	.	.	.	. . .	. . . . .	239
−	−	−	−	.	.	.	.	.	.	.	$\bullet$	.	.	. . .	. . . . .	240
−	−	−	−	.	.	.	.	.	.	.	$\bullet$	.	.	. . .	. . . . .	241
−	−	−	−	.	.	.	.	.	.	.	$\bullet$	.	.	. . .	. . . . .	242
−	−	−	−	.	.	.	.	.	.	.	$\bullet$	.	.	. . .	. . . . .	243
−	−	−	−	.	.	.	.	.	.	.	$\bullet$	.	.	. . .	. . . . .	244
−	−	−	−	.	.	.	.	.	.	.	$\bullet$	.	.	. . .	. . . . .	245
−	−	−	−	.	.	.	.	.	.	.	$\bullet$	.	.	. . .	. . . . .	246
−	−	−	−	.	.	.	.	.	.	.	$\bullet$	.	.	. . .	. . . . .	247
−	0	−	−	.	.	.	.	.	.	.	$\bullet$	.	.	. . .	. . . . .	248
+	±	±	±	$\bullet$	.	.	.	.	.	.	.	.	.	. . .	. . . . .	249
−	−	−	−	.	.	.	.	.	.	.	$\bullet$	.	.	. . .	. . . . .	250
−	−	−	−	.	.	.	.	.	.	.	.	.	.	. . .	. . . . .	251
−	−	−	−	.	.	.	.	.	.	.	$\bullet$	.	.	. . .	. . . . .	252

Tab. 2.

	No	B. W.								S. G								Σ					D. M.			
		Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto	Müller	Meinicke
26/XI	253	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	− 0.75	−	−	−	.	−	−	−	−
	254	+	−	−	⧺	−	−	⧺	.	−	−	−	.	−	0	−	−	−	−	−	0	.	−	0	−	−
	255	−	−	−	−	−	−	−	.	−	−	−	.	−	0	−	−	−	−	−	−	.	−	0	−	−
	256	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−	−
	257	+	⧺	±	⧺	⧺	−	⧺	.	⧺	⧺	+	.	+	+	⧺	+	⧺ 6.8	⧺ 15	⧺ 4.5	⧺ 5.3	.	±	+	+	+
	258	⧺	⧺	±	⧺	⧺	⧺	⧺	.	0	⧺	⧺	.	⧺	+	⧺	⧺	⧺ 11	⧺ 12	⧺ 10	⧺ > 27	.	+	+	⧺	⧺
	259	−	−	−	−	−	−	−	.	−	−	−	.	−	0	−	−	−	−	−	−	.	−	0	−	−
	260	⧺	⧺	⧺	⧺	⧺	+	⧺	.	⧺	⧺	+	.	⧺	0	⧺	+	+ 2.5	+ 2.7	+ 2.5	+ ⟩ 2.5	.	±	0	⧺	+
	261	−	−	−	−	−	−	−	.	−	−	−	.	−	0	−	−	− 0.75	−	−	−	.	−	0	−	±
	262	.	.	−	.	.	.	.	.	.	.	−	.	.	.	.	.	−	.	−	.	.	−	.	.	.
	263	−	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	0	−	−	−	.	−	0	−	−
	264	.	−	−	−	−	−	−	.	.	−	−	.	−	0	−	−	.	−	−	−	.	−	0	−	−
	265	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−	−
	266	−	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	−	.	−	0	−	−
	267	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−	−
	268	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	− 0.75	−	−	−	.	−	−	−	−
	269	−	−	−	−	−	−	−	.	−	−	−	.	−	0	−	−	−	−	−	−	.	−	0	−	−
	270	0	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	−	.	−	0	−	−
	271	0	−	−	−	−	−	−	.	−	−	−	.	−	0	−	−	−	−	−	−	.	−	0	−	−
	272	.	.	−	.	.	.	.	.	.	.	.	±	.	.	.	.	.	.	−	.	.	−	.	.	.
27/XI	273	⧺	⧺	⧺	⧺	⧺	⧺	⧺	.	0	0	⧺	0	0	0	0	⧺	0	⧺ > 20	⧺ > 35	0	.	+	0	0	
	274	±	⧺	−	±	+	−	±	.	0	0	−	.	0	0	0	−	0	−	−	−	.	±	−	⧺	
	275	⧺	⧺	⧺	⧺	⧺	⧺	⧺	.	+	+	−	.	+	±	−	+	0	−	−	−	.	+	+	⧺	
	276	⧺	⧺	⧺	⧺	⧺	⧺	⧺	.	0	±	−	.	−	−	±	−	−	−	−	−	.	⧺	⧺	⧺	
	277	⧺	⧺	+	⧺	⧺	⧺	+	.	0	⧺	⧺	.	⧺	⧺	⧺	⧺	⧺ 6.8	+ 3	⧺ 6.4	⧺ 13.4	.	⧺	⧺	⧺	
	278	⧺	⧺	⧺	⧺	⧺	⧺	⧺	.	⧺	⧺	⧺	.	⧺	⧺	⧺	⧺	⧺ > 44	⧺ 32	⧺ 35	⧺ > 54	.	⧺	⧺	⧺	
	279	−	−	−	−	±	−	−	.	−	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−	
	280	⧺	⧺	⧺	⧺	⧺	⧺	+	.	⧺	⧺	⧺	.	⧺	⧺	⧺	⧺	+ 3.9	⧺ 4.4	⧺ 5.5	⧺ 13.4	.	⧺	⧺	⧺	
	281	⧺	⧺	⧺	⧺	⧺	⧺	⧺	.	⧺	⧺	⧺	.	⧺	⧺	⧺	⧺	⧺ > 27	⧺ 8.8	⧺ 22	⧺ > 27	.	⧺	⧺	⧺	
	282	⧺	⧺	+	⧺	⧺	⧺	⧺	.	0	⧺	+	.	+	+	+	+	+ 1.6	+ 1.5	+ 2.5	± 1.3	.	−	−	+	
	283	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−	
	284	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	0	−	−	−	.	−	−	−	
	285	⧺	⧺	⧺	⧺	⧺	⧺	⧺	.	⧺	⧺	⧺	.	⧺	⧺	⧺	⧺	⧺ 13.7	⧺ 12.5	⧺ 13	⧺ > 27	.	⧺	⧺	⧺	
	286	0	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	−	.	−	0	−	
	287	−	−	−	⧺	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−	
	288	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−	

Tab. 2

M. T. R.				Diagnosis													
				Syphilis							Control.						
Madsen	Müller	Otto	Meinicke	I	II	III	Lat.	Cong.	Tabes	D. p.	Tbc.	Grav.	Tumor	Mb. alii & sani	Observ.	No.
–	–	–	–	●t	.	.	.	.	.	.	.	.	.	. . .	+ Sp. pall.	253
–	–	–	–	●t	.	.	.	.	.	.	.	.	.	. . .	+ Sp. pall	254
–	–	–	–	.	.	.	.	.	.	.	.	.	.	Ulcus penis.	÷ Sp. pall	255
±	–	–	–	.	.	.	.	.	.	.	.	.	.	Bubo ing. dupl. Ulc. pen. gangr.		256
±	±	–	±	●t	.	.	.	.	.	.	.	.	.	0 Syph. . . .	+ Sp. pall.	257
±	±	–	±	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	258
±	–	–	–	.	.	.	●t	.	.	.	.	.	.	. . .	. . . . .	259
±	±	±	+	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	260
–	–	–	–	●t	.	.	.	.	.	.	.	.	.	. . .	. . . . .	261
–	.	.	.	.	.	.	.	.	.	.	.	.	.	Scarlatina.	. . . . .	262
–	–	–	–	●t	.	.	.	.	.	.	.	.	.	. . .	. . . . .	263
–	–	–	–	.	.	.	.	.	.	.	.	.	.	Scleros. dissiminata.	. . . . .	264
–	–	–	–	.	.	.	.	.	.	●	.	.	.	. . .	. . . . .	265
–	–	–	–	.	.	.	.	.	.	.	.	.	.	Scleros. dissiminata.	. . . . .	266
–	–	–	–	.	.	.	.	.	●	.	.	.	.	. . .	. . . . .	267
–	–	–	–	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .	268
–	–	–	–	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .	269
–	–	–	–	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .	270
–	–	–	–	.	.	.	●t	.	.	.	●t	.	.	. . .	Syphilis sanata.	271
–	.	.	.	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .	272
±	0	0	±	.	.	.	.	.	.	●	.	.	.	. . .	. . . . .	273
0	0	0	–	.	.	.	.	.	.	●	.	.	.	. . .	. . . . .	274
+	±	±	±	.	.	.	.	.	.	●	.	.	.	. . .	. . . . .	275
0	+	+	±	.	.	.	.	.	.	●	.	.	.	. . .	. . . . .	276
±	±	±	±	.	.	.	.	.	.	●	.	.	.	. . .	. . . . .	277
±	+	±	±	.	.	.	.	.	.	●	.	.	.	. . .	. . . . .	278
–	–	–	–	.	.	.	.	.	.	.	.	.	.	Dementia præcox.	. . . . .	279
±	+	±	±	.	.	.	●t	.	.	.	.	.	.	. . .	. . . . .	280
±	+	±	±	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	281
0	–	±	+	±	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	282
0	–	–	–	.	.	.	●t	.	.	.	.	.	.	. . .	. . . . .	283
–	–	–	–	.	.	.	.	.	.	.	.	.	.	Scarlatina.	. . . . .	284
0	±	±	±	±	.	.	●t	.	.	.	.	.	.	. . .	. . . . .	285
0	–	–	–	–	.	.	.	.	.	.	.	●	.	. . .	. . . . .	286
–	–	–	–	–	.	.	.	.	.	.	.	.	.	Hæmorrh. cerebri. Ramollitio cerebri. Enceph. seq.	. . . . .	287
–	–	–	–	–	.	.	.	.	.	.	.	.	.		. . . . .	288

Tab. 2.

No.	B. W.								S. G.								Σ					D. M.			
	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto	Müller	Meinicke
27/XI 289	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
290	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
291	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
292	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
293	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
294	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—	—
295	—	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—	—
296	—	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	0	—	—	—	.	—	0	0	—
297	—	—	—	—	—	—	±	.	0	—	—	.	0	0	—	—	0	—	—	—	.	—	—	—	—
298	∓	+	±	±	+	+	±	.	0	+	±	.	+	±	∓	∓	—	—	—	—	.	—	0	—	—
299	—	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—	—
300	—	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	0	—	—	—	.	—	0	—	—
301	—	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—	—
302	∓	∓	+	∓	∓	∓	∓	.	0	∓	+	.	∓	0	+	∓	± 1.3	+ 3.0	+ 1.8	+ 1.9	.	—	0	∓	∓
303	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
304	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
305	—	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	0	—	—	—	.	—	0	—	—
306	.	.	—	.	.	.	.	.	.	.	—	.	.	.	.	.	.	.	—	.	.	±	.	.	.
307	0	0	—	0	0	0	0	.	0	0	—	.	0	0	0	0	0	0	—	0	.	—	0	0	0
308	—	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—	—
309	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
310	∓	∓	±	∓	∓	+	+	.	+	±	—	.	—	—	+	+	— 0.89	—	—	—	.	—	±	+	—
311	±	—	—	—	—	—	—	.	0	—	±	.	—	0	—	—	—	—	—	—	.	—	0	—	—
312	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	— 0.89	—	—	—	.	—	—	—	—
313	0	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	— 0.53	—	—	—	.	—	—	—	—
314	0	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
315	0	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	0	—	—	—	.	—	—	—	—
316	0	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
317	0	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
318	0	—	—	—	—	—	—	.	0	—	±	.	—	0	—	—	—	—	—	—	.	—	0	—	—
319	0	—	—	—	—	0	—	.	0	—	—	.	—	0	—	—	0	—	—	—	.	—	0	—	—
320	0	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	0.89	—	—	—	.	—	—	—	—
321	0	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—	—
322	0	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—	—
323	0	∓	∓	∓	∓	∓	∓	.	0	∓	∓	.	∓	0	∓	∓	∓ 13.7	∓ 12	∓ 6.4	∓ 13.4	.	∓	0	∓	—
324	0	—	—	—	—	—	—	.	0	—	—	.	—	±	—	—	—	0	—	—	.	—	—	—	—

Tab. 2.

M. T. R.				Diagnosis													
				Syphilis							Control.						
Hansen	Madsen	Müller	Otto	Meinicke	I	II	III	Lat.	Cong.	Tabes	D. p.	Tbc.	Grav.	Tumor	Mb. alii & sani	Observ.	No.
-	−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . . .	289
-	−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . . .	290
-	−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . . .	291
)	−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . . .	292
-	+	+	±	+	.	.	.	.	.	.	.	.	●	.	. . .	Gravid V—VI mens. 0 Syphilis.	293
-	−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . . .	294
	−	−	−	−	.	.	.	.	.	.	.	.	.	.	Mania.	. . . . .	295
	−	−	−	−	.	.	.	.	.	.	.	.	.	.	Spondylit. tbc?	. . . . .	296
	−	−	−	−	.	.	.	.	.	.	.	.	.	.	Bronchitis chron.	. . . . .	297
	−	±	−	−	.	.	.	.	.	.	●	.	.	.	. . .	. . . . .	298
	−	−	−	−	.	.	.	.	.	.	.	.	.	.	Sequelæ cont. gen. sin.	. . . . .	299
	−	−	−	−	.	.	.	.	.	.	.	.	.	.	Thromb. s. hæmorrh. cerebri.	. . . .	300
	−	−	−	−	.	.	.	.	.	.	.	.	.	.	Polyneurit. alcoholica.	. . . . .	301
	±	±	±	±	.	.	.	.	.	.	●?	.	.	.	. . .	. . . . .	302
	−	−	−	−	.	.	.	.	.	.	.	.	.	.	Ulcus cruris.	. . . . .	303
	−	−	−	−	.	.	.	.	.	.	.	.	.	.	Vit. cordis.	. . . . .	304
	−	−	−	−	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .	305
	−	.	.	.	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .	306
	−	0	0	0	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .	307
	−	−	−	−	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .	308
	−	−	−	−	.	.	.	.	.	.	.	●	.	.	Lupus vulg.	. . . . .	309
	−	±	+	+	.	.	●t	.	.	.	.	.	.	.	. . .	. . . . .	310
	−	−	−	−	.	.	.	.	.	.	.	●	.	.	Lymphomata colli.	. . . . .	311
	−	−	−	−	.	.	.	.	.	.	.	●	.	.	Lupus vulg.	. . . . .	312
	−	−	−	−	.	.	.	.	.	.	.	.	◎	.	. . .	. . . . .	313
	−	−	−	−	.	.	.	.	.	.	.	.	.	.	Eczema.	. . . . .	314
	−	−	−	−	.	.	.	.	.	.	.	.	.	.	Ulcus cruris.	. . . . .	315
	−	−	−	−	.	.	.	.	.	.	.	.	●	.	. . .	. . . . .	316
	−	−	−	−	.	.	.	.	.	.	.	●	.	.	Erythema indurat.	. . . . .	317
(	−	±	±	−	.	.	.	.	.	.	.	.	.	.	Morb. Menieri.	. . . . .	318
(	−	−	0	−	.	.	.	.	.	.	.	.	.	.	Gastritis.	. . . . .	319
(	−	−	0	−	●t	.	.	.	.	.	.	.	.	.	. . .	. . . . .	320
(	−	−	−	−	●t	.	.	.	.	.	.	.	.	.	. . .	. . . . .	321
(	−	−	−	−	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	322
(	+	±	+	±	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	323
(	−	−	−	−	.	.	.	.	.	.	●	.	.	.	. . .	. . . . .	324

Tab. 2.

No.	B. W.							S. G.							Σ					D. M.			
	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto	Müller	Meinicke
27/XI 325	0	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—	—
326	0	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	0	—	—	—	.	—	0	—	—
327	.	.	—	.	.	.	.	.	.	.	—	.	.	.	.	.	.	.	—	.	.	—	.	.	.
328	0	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
329	0	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	0	—	—	—	.	—	0	—	—
28/XI 330	0	±	—	±	±	—	±	.	0	±	—	.	—	±	±	—	0	—	—	— 0.89	.	—	—	±	—
331	0	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
332	±	—	—	—	—	—	—	.	—	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—	—
333	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
334	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—	—
335	±	±	±	±	±	±	±	.	0	±	±	.	±	±	±	±	± >34	± >24	± 20	± >27	.	±	0	±	±
336	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—	—
337	—	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	0	—	— 0.8	—	.	±	0	—	—
338	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—	—
339	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—	—
340	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—	—
341	±	±	±	±	±	±	±	.	0	±	±	.	±	0	±	±	± 14.1	0	± 18	± 2.5	.	±	0	±	±
342	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—	—
343	+	±	—	±	+	—	±	.	—	—	—	.	—	±	—	±	— 0.53	—	—	—	.	—	0	—	—
344	—	—	—	+	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—	—
345	±	±	±	±	±	±	±	.	±	±	±	.	±	±	±	±	± 11.8	± 5.4	± 16.5	± 13.4	.	±	0	±	—
346	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—	—
347	±	±	±	±	±	±	±	.	0	±	±	.	±	±	±	±	± 10.1	0	± 10	± >17	.	±	0	±	—
348	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	± 1.3	—	—	—	.	—	0	—	—
349	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	— 0.89	—	—	—	.	—	0	—	—
350	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—	—
351	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—	—
352	—	—	—	—	—	—	—	.	0	—	—	.	—	0	—	—	—	0	—	—	.	—	0	—	—
353	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	±	± 1.3	—	—	—	.	—	0	—	—
354	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—1	—	—	.	—	0	—	—
355	—	—	—	—	—	—	—	.	0	—	—	.	—	±	—	—	± 1.3	—1	—	—	.	—	0	—	—
356	—	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	— 0.66	—	—	—	.	—	0	—	—
357	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—	—
358	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—	—
359	—	—	—	—	—	—	—	.	—	—	—	.	—	—	—	—	—	—	—	—	.	—	0	—	—
360	±	—	—	+	±	—	—	.	+	—	—	.	—	—	—	+	+ 2.0	—	+ 1.5	— 0.89	.	—	0	—	—

Tab. 2.

M. T. R.				Diagnosis												
				Syphilis							Control.					
Madsen	Müller	Otto	Meinicke	I	II	III	Lat.	Cong.	Tabes	D. p.	Tbc.	Grav.	Tumor	Mb. alii & sani	Observ.	No.
–	–	–	–								●					325
–	–	–	–											Sequel. apoplex. cerebri.		326
–	.	.	.								●					327
–	–	–	–										○			328
–	–	0	–											Nephroscleros.		329
–	±	–	–											Pyelonephritis.		
–	–	–	–											Diabet. mellit. Coma.		330
–	–	–	–									●				331
–	–	–	–									●				332
–	–	–	–									●		Nephritis.		333
–	–	–	–									●				334
++	++	++	++									●				335
–	–	–	–									●				336
–	–	–	–									●				337
–	–	–	–									●				338
–	–	–	–									●				339
–	–	–	–									●				340
+	++	0	++									●		Partus.	= Nr. 37.	341
–	–	–	–									●				342
–	–	–	–			●t						●				343
–	–	–	±									●				344
+	++	+	++									●			= Nr. 13.	345
–	–	–	–								●			Lupus vulgaris.		346
++	++	++	++			●t										347
–	–	–	–								●			Lupus vulgaris.		348
–	–	–	–											Xeroderm. pigm.		349
–	–	–	–								●			Lupus vulgaris.		350
–	–	–	–								●			Lymphomata colli.		351
–	–	–	–									●				352
–	–	–	–								●			Eryth. pernio.		353
–	–	–	–								●			Lupus vulg.		354
–	–	–	–								●			Lupus vulgaris.		355
–	–	–	–								●			Erythema pernio.		356
–	–	–	–													357
–	–	–	–		●t									Arthroitis urica.		358
–	–	–	–								●					359
±	±	±			●t									Gonorrh.		360

Tab. 2.

No.	B. W.								S. G.								Σ					D. M.		
	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto	Müller Meinicke
361	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−1	−	−	.	−	0	− −
362	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	−	−	−	−	.	−	0	− −
363	0	∓	−	∓	+	±	±	.	∓	∓	+	.	+	∓	+	∓	+ 1.9	+ 1.8	+ 1.5	± 1.1	.	±	0	+ +
364	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	± 1.1	−	.	−	0	− −
365	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	0	−	−	.	−	0	− −
366	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	0	−	−	.	−	0	− −
367	−	+	±	−	±	−	−	.	0	∓	∓	.	∓	∓	+	∓	−	−1	−	−	.	−	0	− −
368	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	0	− −
369	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	− 0.89	−	−	−	.	−	0	− −
370	+	+	−	∓	+	∓	±	.	0	+	−	.	±	+	−	∓	+ 1.75	+ 2.6	+ 1.8	± 1.3	.	−	0	± ±
371	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	± 1.3	−	−	−	.	−	0	− −
372	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	−	−	−	−	.	−	0	− −
373	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	0	− −
374	−	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	0	0	−	−	.	−	0	− −
375	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	0	0	−	−	.	−	0	− −
376	0	−	−	−	−	−	−	.	−	−	−	.	−	0	−	−	−	−	−	−	.	−	0	− −
377	0	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	−	.	−	0	− −
378	0	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	−	.	−	0	− −
379	−	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	0	−	−	.	−	0	− −
380	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	−	−	−	−	.	−	0	− −
381	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	0	− −
382	−	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	−	.	−	0	− −
383	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	0	−	−	−	.	−	0	− −
384	∓	∓	∓	∓	∓	∓	∓	.	0	∓	∓	.	∓	0	∓	∓	∓ >27	∓ 12.0	∓ 22	∓ 5.1	.	∓	0	∓ ∓
385	−	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	−	.	−	0	− −
386	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	−	− −
387	.	.	−	.	.	.	.	.	.	.	±	.	.	.	.	.	.	.	−	−	.	−	.	− −
388	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	0	−	−	−	.	−	−	− −
389	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	−	− −
390	.	.	−	−	.	.	.	.	.	.	−	.	.	.	.	.	.	.	−	.	.	−	.	− −
391	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	−	− −
392	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	−	−	−	−	.	−	−	− −
393	±	−	±	−	−	±	−	.	−	−	±	.	−	−	−	−	−	−	−	−	.	−	−	− −
394	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	−	− −
395	−	−	±	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	−	− −
396	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	−	−	−	−	.	−	−	− −

Tab. 2.

M. T. R.				Diagnosis														
				Syphilis							Control.							
Madsen	Müller	Otto	Meinicke	I	II	III	Lat.	Cong.	Tabes	D. p.	Tbc.	Grav.	Tumor	Mb.alii & sani	Observ.			№
−	−	−	−	.	.	.	.	.	.	.	.	.	.					
−	−	−	−	.	●t	.	.	.	.	.	.	.	.	Gonorrh.	. . . . .			361
╪	+	╪	╪	.	.	●t	.	.	.	.	.	.	.	. . .	. . . . .			362
╪	−	±	−	.	.	.	.	.	.	.	.	.	.	. . .	. . . . .			363
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Gonorrh.	. . . . .			364
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Influenza.	. . . . .			365
−	−	−	−	.	.	.	.	.	.	.	●	.	.	Lupus vulgaris.	Vaccina tub. Dreyeri tract.			366
−	−	−	−	.	.	.	.	.	.	.	●	.	.	Lupus vulgaris.	Vaccina tub. Dreyeri tract.			367
−	−	−	−	.	.	.	.	.	.	.	●	.	.	Lymphom. colli.	. . . . .			368
⊢	╪	╪	╪	.	.	.	●t	.	.	.	.	.	.	Rosacea.	. . . . .			369
.	−	−	−	.	.	.	.	.	.	.	.	.	.	. . .	. . . . .			370
.	−	−	−	.	.	.	.	.	.	.	.	.	.	Impetigo.	. . . . .			371
.	−	−	−	.	.	.	.	.	.	.	.	.	.	Lues?	. . . . .			372
.	−	−	−	.	.	.	.	.	.	.	●	.	.	Struma.	. . . . .			373
	−	−	−	.	.	.	.	.	.	.	.	.	.	Lymphomata colli.	. . . . .			374
	−	0	−	.	.	.	.	.	.	.	.	.	.	Rosacea.	. . . . .			375
.	−	−	−	.	.	.	.	.	.	.	.	.	.	Climacterium.	. . . . .			376
.	−	−	−	.	.	.	.	.	.	.	.	.	.	Intoxicatio.	. . . . .			377
.	−	−	−	.	.	.	.	.	.	.	.	.	.	Sequel. apoplexiæ.	. . . . .			378
.	−	−	−	.	.	.	.	.	.	.	.	.	.	Dementia senilis.	. . . . .			379
.	−	−	−	.	.	.	.	.	.	.	.	.	.	Sclerose en plaques.	. . . . .			380
.	−	−	−	.	.	.	.	.	.	.	.	.	.	Ramollitio cerebri.	. . . . .			381
.	−	−	−	.	.	.	.	.	.	.	●	.	.	Lupus erythematosus.	. . . . .			382
.	−	0	−	.	.	.	.	.	.	.	.	.	.	Psychosis manio-depr.	. . . . .			383
+	╪	╪	╪	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .			384
+	−	−	−	.	.	.	.	.	.	.	.	.	.	Cholelithiasis?	. . . . .			385
+	±	−	±	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .			386
−	.	.	.	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .			387
−	−	0	−	.	.	●	.	.	.	.	.	.	.	Colitis.	. . . . .			388
−	−	−	−	.	.	.	.	.	.	.	.	.	.	. . .	. . . . .			389
−	.	.	.	.	.	.	.	.	.	.	.	●	.	. . .	. . . . .			390
±	−	−	−	.	.	.	.	.	.	.	.	.	.	Incontinentia urinæ et alvi	. . . . .			391
−	−	−	−	.	.	.	.	.	.	.	●	.	.	Partus $^{31}/_{11}$.	. . . . .			392
±	╪	╪	+	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .			393
−	−	−	−	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .			394
−	−	−	−	.	.	.	.	.	.	.	.	.	.	Sclerose en plaques.	. . . . .			395
−	−	−	−	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .			396

Tab. 2.

No.	B. W.							S. G.							Σ					D. M.		
	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto	Müller
29. XI 397	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−
398	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−
399	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−
400	++	++	++	++	++	++	++	.	0	++	++	.	+	0	++	++	+ 16.6	+ 12	+ 13	+ > 27	.	+	0	++
401	±	−	±	−	−	−	−	.	−	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−
402	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−
403	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	0	−
404	−	−	−	−	−	−	−	.	−	−	−	.	−	0	−	−	−	−	−	−	.	−	−	−
405	−	±	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	−	−
406	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	0	−
407	−	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	0	.	−	0	−
408	−	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	−	.	−	−	−
409	−	−	−	−	−	−	−	.	−	±	−	.	−	−	−	−	−	−	−	−	.	−	0	−
410	−	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	−	.	−	−	−
411	−	−	−	−	−	−	−	.	0	−	−	.	−	−	−	−	−	−	−	−	.	−	0	−
412	−	−	−	−	−	−	−	.	0	−	±	.	−	0	−	−	−	−	−	−	.	−	0	−
413	−	−	−	−	−	−	−	.	−	−	−	.	−	0	−	−	−	−	−	−	.	−	0	−
414	−	−	−	−	−	−	−	.	−	−	−	.	−	0	−	−	−	−	−	−	.	−	0	−
415	−	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	−	.	−	−	−
416	.	.	−	.	.	.	.	.	.	.	−	.	·	.	.	.	.	.	−	−	.	−	0	−
417	−	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	−	.	−	0	−
* 418	+	+	−	+	−	0	+	.	0	++	+	.	±	0	0	+	+ 1.5	0	− 0.89	−	.	+	0	−
419	++	++	++	++	++	++	++	.	0	++	++	.	+	0	++	++	+ 2.5	+ 4.5	+ 1.8	+ 2.2	.	−	0	−
420	−	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	−	.	−	0	−
421	−	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	−	.	−	−	−
422	−	−	−	−	−	−	−	.	−	−	±	.	−	−	−	−	−	−	−	−	.	−	−	−
423	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	−	−	−	−	.	−	−	++
424	++	++	++	++	++	++	++	.	++	++	++	.	+	++	++	++	+ 3.2	+ 5.0	+ 4.4	+ 11.3	.	−	−	++
425	−	−	−	−	−	−	−	.	−	−	−	.	−	−	−	−	± 1.1	−	−	+ > 2.2	.	−	−	−
426	−	−	−	−	−	−	−	.	0	−	±	.	−	0	−	−	−	−	−	−	.	−	−	−
427	−	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	− 0.89	.	−	−	−
428	−	−	−	−	−	0	−	.	0	±	−	.	−	0	0	0	− 0.75	0	−	−	.	−	−	−
429	0	−	−	−	−	−	−	.	−	−	−	.	−	0	−	−	− 0.89	−	−	± 1.1	.	−	−	−
430	0	−	−	−	−	−	−	.	0	−	−	.	−	0	−	−	−	−	−	0	.	−	−	−
431	0	++	++	++	++	++	++	.	+	++	+	.	+	++	+	++	+ 3.0	+ 6.2	+ 3.6	+ 13.4	.	+	−	−
432	.	.	−	−	.	.	.	.	.	.	.	.	−	.	.	.	−	.	.	−	.	.	.	.

* Voir Annexe II — 5*a*.

Tab. 2.

| M. T. R. | | | | Diagnosis | | | |

Tab. 2.

No.	B. W.								S. G.								Σ					D. M.		
	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto	Müller
29/XI 433	0	—	—	—	—	—	—	.	0	—	—	.	—	—	—	—	—	—	—	—	.	—	—	—
434	0	—	—	—	—	0	—	.	—	—	—	.	—	0	—	—	—	—	—	—	.	—	0	—
435	0	—	±	0	—	0	—	.	0	—	—	.	—	0	—	—	—	0	—	—	.	—	0	—
30/XI 436	0	—	—	—	—	—	—	.	.	0	—	.	0	.	.	±	0	0	0	0	.	—	.	0
437	0	#	—	#	#	#	#	.	.	0	—	.	0	.	.	+	−0.66	0	0	0	.	—	.	0
438	0	—	—	—	—	—	—	.	.	0	—	.	0	.	.	—	—	0	0	0	.	—	.	—
439	—	—	—	#	—	0	—	.	.	—	—	.	—	.	.	—	—	0	—	—	.	—	.	—
440	#	#	#	#	#	#	#	.	.	#	#	.	#	.	.	#	#>34	0	#25	+⟩3.8	.	#	.	#
441	#	+	—	#	0	0	#	.	.	#	±	.	0	.	.	+	+1.6	0	+2.5	±1.3	.	—	.	0
442	#	#	#	#	#	#	#	.	.	#	#	.	#	.	.	#	+3.8	0	#8.2	#⟩6.7	.	+	.	+
443	#	#	#	#	0	—	#	.	.	+	—	.	0	.	.	—	—	0	—	—	.	—	.	—
444	#	+	—	+	0	0	—	.	.	+	—	.	0	.	.	+	−0.89	0	—	—	.	—	.	—
445	—	—	—	—	0	—	—	.	.	—	—	.	0	.	.	—	—	0	—	—	.	—	.	—
446	#	#	#	#	#	0	#	.	.	#	+	.	+	.	.	#	#5.1	+1.8	+3.2	+1.3	.	—	.	—
447	—	—	—	—	—	0	±	.	.	±	—	.	—	.	.	—	—	—	—	—	.	—	.	—
448	#	#	#	#	#	#	#	.	.	#	#	.	#	.	.	#	#16.6	#5	#>5	#⟩10.7	.	+	.	—
449	#	#	#	#	#	#	#	.	.	#	#	.	#	.	.	#	#>34	#>32	#⟩100	+1.6	.	#	.	—
450	.	.	#	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+3.2	.	.	—	.	—
451	#	#	#	#	#	#	#	.	.	#	#	.	#	.	.	#	#19.2	#12	#32	#10.7	.	#	.	—
452	±	—	—	+	0	0	—	.	.	—	±	.	0	.	.	—	—	—	—	—	.	—	.	—
453	—	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	−0.89	—	—	—	.	—	.	—
454	—	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	—	—	—	.	—	.	—
455	.	.	—	.	.	.	.	.	.	.	—	.	.	.	.	.	.	.	—	.	.	—	.	—
456	.	.	—	.	.	.	.	.	.	.	—	.	.	.	.	.	.	.	—	.	.	—	.	—
457	—	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	—	—	—	.	—	.	—
458	—	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	—	—	—	.	—	.	—
459	#	#	#	#	0	#	#	.	.	#	+	.	0	.	.	#	—	±5.2	—	—	.	—	.	—
460	#	#	#	#	#	#	#	.	.	#	#	.	#	.	.	#	#6.8	#5.5	#5	+⟩1.7	.	+	.	—
461	.	.	—	.	.	.	.	.	.	0	+	.	.	.	.	.	.	.	—	.	.	—	.	—
462	±	—	—	0	0	—	—	.	.	+	±	.	0	.	.	+	—	—	—	—	.	—	.	—
463	0	0	—	0	+	+	#	.	.	0	—	.	0	.	.	±	0	.	—	0	.	—	.	+
464	#	+	—	±	+	+	+	.	.	#	#	.	+	.	.	+	—	—	—	—	.	—	.	—
465	—	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	—	—	—	.	—	.	—
466	—	—	—	—	—	0	—	.	.	±	—	.	—	.	.	—	—	—	—	—	.	—	.	—
467	+	—	—	#	0	0	—	.	.	—	—	.	0	.	.	±	−0.75	—	—	−0.75	.	—	.	0
468	#	±	—	#	0	+	—	.	.	+	+	.	0	.	.	+	+1.5	—	+1.8	±⟩1.1	.	±	.	0

Tab. 2.

M. T. R.					Diagnosis																	
					Syphilis							Control.										
Anacid.	Madsen	Müller	Otto	Meinicke	I	II	III	Lat.	Cong.	Tabes	D. p.	Tbc.	Grav.	Tumor	Mb.alii & sani	Observ.	No.
-	—	—	—	—	.	.	.	.	.	.	.	●	.	.	Lupus vulg.	. . . .	433
-	—	—	—	—	.	.	.	.	.	.	.	.	.	.	Diabet. mellit. Hemiplegia	. . . .	434
	—	—	—	—	.	.	.	.	.	.	.	●	.	.	Lupus vulg.	. . . .	435
	—	0	0	0	.	.	.	.	.	.	.	.	.	.	Dement. præc. paranoid	. . . .	436
	—	0	0	0	.	.	.	.	.	.	●?	.	.	.	. . .	B. W. pos.	437
	—	0	0	0	.	.	.	.	●	.	.	.	.	.	Dement. præcox.	. . . .	438
	—	—	—	—	.	.	.	.	●	.	.	.	.	.	Dement. præcox.	. . . .	439
	±	±	±	±	.	.	●t	.	●	.	.	.	.	.	. . .	. . . .	440
	—	0	—	—	.	.	.	.	●	.	●	.	.	.	. . .	Malaria inoc. (Jan. 1923)	441
	±	±	±	±	.	.	.	.	●	.	●	.	.	.	. . .	Malaria inoc. (Juli 1923)	442
	—	0	—	—	.	.	.	.	●	.	●	.	.	.	. . .	Malaria inoc. (Sept. 1923)	443
	—	0	±	—	.	.	.	.	●	.	●	.	.	.	. . .	Malaria tractat. (Dec. 1922)	444
	—	0	0	—	.	.	.	●t	.	.	.	.	.	.	Ulcus vener.	. . . .	445
	±	±	+	±	.	.	.	●t	.	.	.	.	.	.	. . .	. . . .	446
	—	—	—	—	.	.	.	●t	.	.	.	.	.	.	. . .	. . . .	447
	±	±	±	±	.	●t	.	.	.	.	.	.	.	.	. . .	. . . .	448
	±	±	±	±	.	●t	.	.	.	.	.	.	.	.	. . .	. . . .	449
	+	.	.	.	●t	.	.	.	.	.	.	.	.	.	. . .	. . . .	450
	±	±	±	±	.	.	●t	.	.	.	.	.	.	.	. . .	. . . .	451
	—	0	—	—	.	.	.	.	.	.	.	.	.	.	Gonorrh.	. . . .	452
	—	—	—	—	.	●t	.	.	.	.	.	.	.	.	. . .	. . . .	453
	—	—	—	—	.	.	.	.	.	.	.	.	.	.	Gonorrh.	. . . .	454
	—	.	.	.	.	.	.	.	.	.	.	.	.	.	Gonorrh.	. . . .	455
	—	.	.	.	.	.	.	.	.	.	.	●	.	.	Lupus erythematosus	. . . .	456
0	—	—	—	—	.	.	.	.	.	.	.	.	.	.	Diabet. mellit.	. . . .	457
	—	—	—	—	.	.	.	.	.	.	.	●	.	.	Lymphom. colli	. . . .	458
±	±	0	±	±	.	.	.	.	.	.	●	.	.	.	. . .	. . . .	459
±	±	±	±	±	.	.	.	.	.	.	●	.	.	.	. . .	. . . .	460
	—	.	.	.	.	.	.	.	.	.	.	.	.	.	Climacterium Nervosismus	Nr. 44	461
0	—	0	±	—	.	.	●t	.	.	.	.	.	.	.	. . .	. . . .	462
0	—	0	0	0	.	.	●t	.	.	.	.	.	.	.	. . .	. . . .	463
±	±	+	±	±	.	.	.	.	.	.	●	.	.	.	. . .	. . . .	464
	—	—	—	—	.	.	.	.	.	.	.	●	.	.	Lymphom. colli	. . . .	465
	—	—	—	—	.	.	.	.	.	.	.	.	.	.	Ischias duplex	. . . .	466
	—	0	—	—	.	.	.	●t	.	.	.	●	.	.	Lupus erythematosus	. . . .	467
	—	0	+	—	.	.	.	.	.	●	.	.	.	.	. . .	. . . .	468

Tab. 2.

No.	B. W.								S. G.								Σ					D. M.			
	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto	Müller	Meinicke
30/XI 469	‡	‡	‡	‡	0	‡	‡	.	.	‡	±	.	0	.	.	‡	0	—	—	—	.	+	.	0	‡
470	.	.	—	.	.	.	.	.	.	.	—	.	.	.	.	.	. .	. .	—	. .	.	—	.	.	.
471	‡	‡	‡	‡	‡	+	‡	.	.	‡	+	.	‡	.	.	‡	+ 3.0	+ 2.6	‡ 4.1	‡ 〉 5.3	.	—	.	‡	‡
472	‡	‡	‡	‡	‡	‡	‡	.	.	‡	‡	.	‡	.	.	‡	‡ > 54	‡ > 50	‡ 100	‡ > 5.3	.	‡	.	‡	‡
473	‡	‡	‡	‡	‡	‡	‡	.	.	‡	+	.	‡	.	.	‡	+ 3.2	+ 2.3	+ 2.5	+ 2.5	.	+	.	‡	+
474	‡	‡	‡	‡	‡	‡	‡	.	.	‡	‡	.	‡	.	.	‡	‡ 5.3	+ 3	‡ 8.8	‡ > 5.3	.	+	.	‡	‡
475	±	—	—	—	—	0	—	.	.	—	—	.	—	.	.	±	—	—	—	—	.	—	.	—	—
476	—	—	—	—	—	0	—	.	.	0	—	.	—	.	.	—	0	—	—	—	.	—	.	—	—
477	—	—	—	—	0	0	—	.	.	—	—	.	—	.	.	—	—	—	—	—	.	—	.	—	—
478	—	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	—	—	—	.	—	.	—	—
479	—	—	—	‡	0	0	—	.	.	—	—	.	0	.	.	—	—	—	—	—	.	—	.	—	—
480	—	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	0	—	—	.	—	.	—	—
481	—	—	—	—	—	0	—	.	.	—	±	.	—	.	.	—	—	—	—	—	.	—	.	—	—
482	.	.	—	.	.	.	.	.	.	.	—	.	.	.	.	.	. .	. .	—	. .	.	—	.	.	.
483	‡	+	‡	‡	‡	+	‡	.	.	‡	+	.	‡	.	.	‡	+ 3.0	—	+ 2.5	0	.	—	.	‡	‡
484	—	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	—	—	—	.	—	.	—	—
485	‡	‡	‡	‡	‡	‡	‡	.	.	‡	‡	.	‡	.	.	‡	‡ > 54	0	‡ 100	‡ > 6.7	.	‡	.	‡	‡
486	—	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	— 0.53	0	—	—	.	—	.	—	—
487	—	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	0	—	—	.	—	.	—	—
488	‡	‡	‡	‡	‡	0	‡	.	.	‡	‡	.	‡	.	.	‡	‡ > 34	0	‡ 25	+ > 2.5	.	‡	.	‡	+
489	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	0	—	—	.	—	.	—	—
490	.	—	—	—	0	0	—	.	.	—	±	.	0	.	.	—	—	—	—	—	.	—	.	0	.
491	.	—	—	—	0	0	—	.	.	—	—	.	0	.	.	—	— 0.53	—	± 1.1	—	.	—	.	.	.
492	.	‡	‡	‡	‡	‡	‡	.	.	‡	+	.	‡	.	.	‡	+ 3.2	0	+ 2.5	+ > 2.5	.	—	.	+	.
493	.	—	—	—	0	0	—	.	.	—	—	.	0	.	.	—	—	0	—	—	.	—	.	0	.
494	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	0	—	—	.	—	.	—	—
495	.	‡	‡	‡	‡	‡	‡	.	.	‡	‡	.	‡	.	.	‡	‡ > 54	0	‡ 〉 100	+ > 2.5	.	‡	.	+	.
496	.	‡	‡	‡	+	0	‡	.	.	‡	+	.	‡	.	.	‡	+ 3.2	0	+ 3.5	+ > 2.5	.	—	.	+	.
497	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	0	—	—	.	—	.	—	—
498	.	—	—	±	0	0	—	.	.	—	—	.	0	.	.	—	—	0	—	—	.	—	.	0	.
499	.	±	—	‡	±	.	+	.	.	±	±	.	—	.	.	+	— 0.75	0	—	— 0.89	.	—	.	—	—
500	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	— 0.75	0	—	—	.	—	.	—	—
501	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	0	—	—	.	—	.	—	—
502	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	0	—	—	.	—	.	—	—
503	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	0	—	—	.	—	.	—	—
504	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	—	—	—	.	—	.	—	—

Tab. 2.

| M. T. R. | | | | | Diagnosis | | | | |

Tab. 2.

No.	B. W.							S. G.							Σ					D. M.			
	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Muterm.	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Otto	Müller	Meinicke
30/XI 505	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	— 0.53	—	—	—	.	—	.	—	—
506	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	0	± 1.1	—	.	—	.	—	—
507	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	— 0.53	—	—	—	.	—	.	—	—
508	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	—	—	—	.	—	.	—	—
509	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	—	—	—	.	—	.	—	—
510	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	± 1.1	—	—	—	.	—	.	—	—
511	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	—	—	—	.	—	.	—	—
512	.	±	—	±	±	0	±	.	.	—	—	.	—	.	.	—	—	—	—	± 1.1	— 0.89	.	—	.	—	—
513	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	—	—	—	—	.	—	.	—	—
514	.	±	±	±	±	0	±	.	.	±	±	.	±	.	.	±	± 19.2	± 4.5	± 25	± >22	.	±	.	—	±	±
515	.	—	—	—	—	0	—	.	.	—	±	.	—	.	.	—	—	—	—	—	.	—	.	—	0	—
516	.	—	—	—	0	0	—	.	.	—	±	.	0	.	.	—	—	—	—	—	.	—	.	—	—	—
517	.	—	—	—	—	0	—	.	.	—	—	.	—	.	.	—	—	—	—	—	.	—	.	—	0	—
518	.	±	±	±	0	0	±	.	.	+	—	.	0	.	.	—	—	+ 1.5	—	—	.	—	.	—	±	±
519	.	±	±	±	±	±	±	.	.	±	±	.	±	.	.	±	± >44	± 12.5	± 35	± >27	.	±	.	—	—	—
520	.	—	—	—	—	—	—	.	.	—	—	.	—	.	.	—	.	—	—	—	.	—	.	—	+	±
521	.	±	+	±	±	.	±	.	.	±	+	.	±	.	.	±	.	0	+ 1.5	+ 2.5	.	—	.	—	—	—
522	.	—	—	—	—	.	—	.	.	—	—	.	—	.	.	—	.	—	—	—	.	—	.	—	—	—
523	.	—	—	—	—	.	—	.	.	—	±	.	—	.	.	—	.	—	—	—	.	—	.	—	—	—
524	.	—	—	—	—	.	—	.	.	—	—	.	—	.	.	—	.	0	—	—	.	—	.	—	—	—
525	.	—	—	—	—	.	—	.	.	—	—	.	—	.	.	—	.	—	—	—	.	—	.	—	—	—
526	.	—	—	—	—	.	—	.	.	—	—	.	—	.	.	±	.	—	—	—	.	—	.	—	—	—
527	.	±	±	±	±	.	±	.	.	±	+	.	±	.	.	±	.	—1	± 6.4	±) 4.1	.	±	.	±	+	+
528	.	—	—	—	0	.	—	.	.	—	—	.	0	.	.	—	.	—	—	—	.	—	.	—	0	—
529	.	—	—	—	—	.	—	.	.	—	—	.	—	.	.	—	0	—	—	—	.	—	.	—	—	—
530	.	±	±	±	0	.	±	.	.	±	+	.	0	.	.	±	.	+ 1.5	+ >2.5	± >4.4	.	—	.	—	0	—
531	.	—	—	—	—	.	—	.	.	—	—	.	—	.	.	—	.	—	—	—	.	—	.	—	—	—
532	.	±	—	+	±	.	+	.	.	±	—	.	—	.	.	±	.	—	—	— 0.89	.	—	.	—	—	—
533	.	—	—	—	—	.	—	.	.	—	—	.	—	.	.	—	.	—	—	—	.	—	.	—	—	—
534	.	—	—	—	—	.	—	.	.	—	±	.	—	.	.	—	.	—	—	—	.	—	.	—	—	—
535	.	—	—	—	—	.	—	.	.	—	—	.	—	.	.	—	.	—	—	—	.	—	.	—	—	—
536	.	—	—	—	—	.	—	.	.	—	—	.	—	.	.	—	.	—	—	—	.	—	.	—	—	—

Tab. 2.

M. T. R.					Diagnosis												
					Syphilis							Control.					
Hirschf.	Madsen	Müller	Otto	Meinicke	I	II	III	Lat.	Cong.	Tabes	D. p.	Tbc.	Grav.	Tumor	Mb. alii & sani	Observ.	
0	—	—	—	—	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .	505
—	—	—	—	—	.	.	.	.	.	.	.	●	.	.	Lupus vulg.	. . . . .	506
0	—	—	—	—	.	.	.	.	.	.	.	●	.	.	. . .	. . . . .	507
0	—	—	—	—	.	.	.	.	.	.	.	●	.	.	Lupus erythematosus	. . . . .	508
—	—	—	—	—	.	.	.	.	.	.	.	.	●	.	. . .	. . . . .	509
0	—	—	—	—	.	●?	.	.	.	.	.	.	.	.	. . .	Syphilis sanata	510
—	—	—	—	—	.	.	.	.	.	.	.	.	.	.	Paralysis bulbi	. . . . .	511
0	—	—	—	—	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	512
—	—	—	—	—	.	.	.	.	.	.	.	.	.	.	Artritis urica	. . . . .	513
+	++	++	+	++	.	.	.	.	.	.	.	.	.	.	Arteriosclerос. Ulcera pen.	. . . . .	514
—	—	—	—	—	.	.	.	.	.	.	.	.	●	.	Gonorrh.	. . . . .	515
—	—	0	—	—	.	.	.	●t	.	.	.	.	.	.	. . .	. . . . .	516
—	—	—	—	—	.	.	.	.	.	.	.	.	.	.	. . .	. . . . .	517
—	—	0	—	—	.	.	●	.	.	.	.	.	●	.	. . .	. . . . .	518
—	++	++	++	++	.	.	●t	.	.	.	.	.	.	.	Depress. ment. Lues cerebros.?	Pupillæ lent reag. Liq. cerebrosp. XV cellul. cont.	519
	—	—	—	—	.	.	●t	.	.	.	.	.	.	.	. . .	. . . . .	520
—	—	++	++	++	.	.	.	●t	.	.	.	.	.	.	. . .	. . . . .	521
	—	—	—	—	.	.	.	.	.	.	.	.	.	.	. . .	. . . . .	522
	—	—	—	—	.	.	.	●t	.	.	.	.	.	.	Ulcera ven.	. . . . .	523
	—	—	—	—	.	.	.	.	.	.	.	.	.	.	. . .	Syphilis sanata? (Syphilis 1916.)	524
	—	—	—	—	●?	.	.	.	.	.	.	.	.	.	Morb. mental. Infantilism.	. . . . .	525
	—	—	—	—	.	●t	.	.	.	.	.	.	.	.	Balanoposthit.	. . . . .	526
	++	++	++	++	.	.	.	.	●?	.	.	.	.	.	. . .	. . . . .	527
	—	0	—	—	.	.	.	●t	.	.	.	.	.	.	. . .	. . . . .	528
	—	—	—	—	.	.	.	.	.	.	.	.	.	.	. . .	. . . . .	529
+	++	0	++	++	.	.	.	.	.	.	●?	.	.	.	Seq. scarlat. Psoriasis.	. . . . .	530
	—	—	—	—	.	●t	.	.	.	.	.	.	.	.	. . .	. . . . .	531
	—	—	—	—	.	.	.	●t	.	.	.	.	.	.	. . .	. . . . .	532
	—	—	0	—	.	.	.	.	.	.	.	.	.	.	Ulcera vener. Bubo.	. . . . .	533
	—	—	—	—	.	.	.	.	.	.	.	.	.	.	Neuros. traum.	. . . . .	534
0	—	—	—	—	.	.	.	.	.	.	.	.	.	.	Asthm. bronch.	. . . . .	535
	—	—	—	—	.	.	.	.	.	.	.	.	.	.	Neurasthenia	. . . . .	536

Les 536 sérums et liquides cérébrospinaux du tableau 2 proviennent de 531 sujets, un étant omis (N° 55) et 4 ayant été réexaminés comme suit:

N°		N°
8	=	410
13	=	345
39	=	409
44	=	461

Résumé des diagnostics *cliniques*.

Total des cas de syphilis: 190								Total des cas de contrôle: 345			
I	II	III	Lat.	Cong.	Tabes	D.p.	?	Tub.	Grossesse	Tum.	Autres affections et suj. sains
19	42	37	40	3	3	34	12 inci. N° 418	90	103	14 excl. N° 418	138

Des 43 cas de syphilis secondaire, 2 étaient en état de grossesse.
Des 40 cas de syphilis tertiaire, 1 était en état de grossesse.
Des 42 cas de syphilis latente, 1 était en état de grossesse, 4 étaient tuberculeux, 1 était diagnostiqué cancer de l'œsophage.
Des 3 cas de syphilis congénitale, 1 était en état de grossesse.

Dans une série de cas où les résultats présentaient des points d'intérêt spécial, les sérums furent réexaminés par le Dr Wyler après la clôture de la Conférence (voir tableau 3 et annexe II).

The 536 sera and cerebro-spinal fluids in Table 2 actually represent 531 patients, one (No. 55) being omitted, whilst four were retests as follows:

No.		No.
8	=	410
13	=	345
39	=	409
44	=	461

Summary of *clinical* diagnoses.

Total SYPHILIS: 190								Total CONTROLS: 345			
I	II	III	Lat.	Cong.	Tabes	D. p.	?	Tub.	Preg.	Tum.	Mb. alii & sani
19	42	37	40	3	3	34	12 incl. No. 418	90	103	14 excl. No. 418	138

Of the 43 cases of Syphilis II: 2 were pregnant
„ 40 „ „ III: 1 was „
„ 42 „ „ Latent: 1 was „
4 were tubercular
1 was diagnosed as cancer of the œsophagus
„ 3 „ „ cong. 1 was pregnant

In a series of cases in which the results presented points of special interest, the sera were retested by Dr. Wyler after the close of the Conference (see Table 3 and Annex II).

Tab. 3.

No.	Dato venæsect. December 1923	Dato reexaminat. December 1923	B. W. reexam. Dr. Wyler	B. W. exam. conf. Dr. Wyler	Σ reexam. Dr. Wyler	Σ exam. conf. Dr. Wyler	Diagn.	Observ.
19	7	11	±	—	—	—	S. I tr.	4 inject. 606, à 75 cgm. post conf.
30	14	17	++	++	+ 1.9	—1	S. III tr.	
44	6	11	±	±	—	—1	Climact.	
100	7	11	±	++	—	—	S. cong.	Non tract. post conf.
121	8	11	±	±	—	—	S. lat.	5 inj. neosalvars. à 40 cgm. post conf.
123	8	11	++	0	++ > 4.1	0	S. lat.	
129	13	17	+	++	—*)	—	S. lat. tr.	1 inj. neosalvars. à 45 cgm. post conf. *) Σ = 1.1 p 40h.
143	12	15	—	++	—	+ 3.2	S. I tr.	
147	14	17	++	++	—	—	D. p. tr.	
159	15	18	—	—	—	—	S. lat. tr.	Non tract. post conf.
172	12	15	—	—	—*)	—	S. III tr.	*) Σ = 1.1 p. 40h.
175	12	15	—	+	—	+ 1.6	S. I tr.	
205	13	17	—	0	—	—	Ulc. crur.	Aug. Malaria tract.
223	14	17	±	++	—	—	D. p.	Non tract. post conf,
226	14	17	±	++	—	—	D. p.	
275	3	11	++	++	—	0	D. p.	
id.	14	17	++	++	—	0	,,	
276	2	11	++	++	—	—	D. p.	
id.	14	17	++	++	—	—	,,	
348	10	13	—	—	—	± 1.3	Lupus vulg.	
367	7	11	±	—	—	—	,,	p. conf. vaccina Dreyeri tract.
393	6	11	—	±	—	—	,,	Partus
418	10	13	+	+	+ 3.6	+ 1.5	S. lat.?	C. oesophagi? 6—XII: injectio prov cativa neosalvars.
id.	17	18	++	+	+ 3.0	+ 1.5	,,	S. G. ++ [Wyler] B.W., S.G., M.T.R. ++, Σ = 3.2 [Mads
id.	17	18	—	0	—	0	,,	Liq. cerebrosp.
425	12	15	—	—	—	± 1.1	Furunculosis.	
437	15	17	++	0	—	—	D. p.?	Liq. cerebrosp.
439	.	18	—	—	—	—	Dement. præcox	
443	14	17	+	++	—	—	D. p.	Sept. Malaria tract.
444	14	17	±	++	—	—	D. p.	Dec. 1922 Malaria tract.
452	7	11	±	±	—	—	Gonorrh.	(÷ Syphilis)
id.	.	18	±	±	—	—	,,	
464	6	11	±	++	—	—	D. p.?	Non tract.
468	8	11	++	++	—*)	+ 1.5	Tabes dors.	60 cgr. neosalvars. post conf. *) Σ = 1.1 p. 40h.
469	14	17	++	++	—	0	D. p.	October Malaria tract.
479	7	11	—	—	—	—	Gravid.	
491	12	15	—	0	—	—	Eryth. nodos.	
499	13	17	±	0	± 1.1 *)	—	Lupus vulg.	*) Σ = 1.1 p. 40h.
512	12	15	±	0	—	—	S. II tr.	
518	7	13	++	0	—	—	Depressio mentis Lues cerebrosp.?	
532	11	15	±	±	—	0	S. lat. tr.	Non tract. post conf.

(Suite à la page 66.)
(Continuation on page 66.)

Le tableau 3 nous montre que le rapport entre les résultats du B.W. et de la Sigmaréaction dans les cas de syphilis avérée fut semblable à celui obtenu pendant la Conférence.

Une étude statistique des résultats des réactions ne pouvait être entreprise à la Conférence. Après une discussion longue et minutieuse, la Conférence a approuvé à l'unanimité les conclusions suivantes, basées sur les résultats portés dans les tableaux.

CONCLUSIONS.

I. Réaction de Bordet-Wassermann

a) Procédés utilisant le sérum inactivé.

Nombre de résultats positifs. — Au cours de la Conférence de Copenhague, la réaction de Bordet-Wassermann a régulièrement fourni le plus grand nombre de résultats positifs dans les cas de syphilis certaine.

Spécificité. — La Conférence signale que quelques expérimentateurs n'ont obtenu aucune réaction positive parmi les sérums de contrôle. Chez les autres, les résultats non spécifiques furent une rare exception. Il est d'ailleurs très délicat d'affirmer avec une certitude absolue l'absence de syphilis dans un cas donné.

Extraits (antigènes). — Les méthodes basées sur l'emploi de plusieurs extraits ne se sont pas montrées supérieures à celles qui n'en utilisent qu'un seul. La valeur du résultat est conditionnée par un titrage soigneux de l'activité de l'alexine et par le mode de préparation de l'antigène au moins autant que par l'utilisation simultanée de plusieurs extraits.

Ce sont les extraits de cœur qui ont fourni les meilleurs résultats.

b) Procédé utilisant le sérum actif (technique pratiquée à l'Institut Pasteur de Paris).

Nombre de résultats positifs. — La Conférence constate que ce procédé a donné, dans les cas de syphilis avérée, un nombre de résultats positifs plus élevé que les méthodes utilisées par les autres chercheurs.

It will be observed from Table 3 that the relation between the B. W. and Σ results in known cases of syphilis was similar to that obtained at the Conference.

Statistical treatment of the results of the tests could not be undertaken at the Conference. After a long and thorough discussion, the following conclusions, based on the results set out in the tables, were unanimously approved.

CONCLUSIONS.

I. Bordet-Wassermann Test.

(*a*) With Inactivated Serum.

Positive results: The Bordet-Wassermann test yielded in this Conference the uniformly greatest number of positive reactions in known cases of syphilis.

Specificity: With regard to specificity, no unspecific results whatever were obtained by certain of the investigators and, on the whole, results which were possibly unspecific occurred very rarely.

Extracts: The results obtained by those workers who employed several extracts were not better than those using one only. It is concluded that the preparations of the extracts and the determination of the precise dose of complement to be used are of at least as great importance as the use of multiple extracts. The best results were obtained with heart extracts.

(*b*) With Active Serum (technique employed in the Pasteur Institute in Paris).

Positive results: The reaction yielded a higher number of positive results in known cases of syphilis than any of the methods used by the other workers.

Spécificité. — Il est suspect, toutefois, de donner des résultats non spécifiques en nombre plus élevé que les autres techniques.

Il y a lieu, en conséquence, de le soumettre à une expérimentation ultérieure, spécialement avec des sérums prélevés depuis un temps assez prolongé avant l'expérience.

II. Réactions de floculation

1. Comparaison des résultats des réactions de floculation avec ceux de la réaction de Bordet-Wassermann.

Les travaux de la présente Conférence ont montré que *les réactions de floculation ne peuvent pas, actuellement, se substituer à la réaction de Bordet-Wassermann.* Il faut cependant souligner le fait qu'elles ont donné, au cours de cette réunion, des réactions positives dans un certain nombre de cas de syphilis, alors que la réaction de Bordet-Wassermann était négative et quoique celle-ci se soit, dans l'ensemble, montrée plus sensible.

Il est recommandé, par conséquent, de pratiquer concurremment la réaction de Bordet-Wassermann et les réactions de floculation, cette combinaison ayant donné les meilleurs résultats.

2. Comparaison des résultats des différentes réactions de floculation.

a) *Réaction de Meinicke D.M.*

L'examen des résultats des divers expérimentateurs qui ont utilisé la D.M. avant et pendant la Conférence de Copenhague montre que cette réaction a donné, à quelques exceptions près, des résultats spécifiques, mais trop faibles dans l'ensemble. Cette faiblesse des résultats a été, au cours des travaux actuels, plus marquée encore qu'on n'eût pu le prévoir, si l'on tient compte des essais antérieurs.

Au surplus, on peut écarter de la discussion la réaction de Meinicke D.M., l'auteur lui-même l'ayant remplacée par sa « Trübungsreaktion », qui utilise comme base le même extrait.

Specificity: At the same time, the suspicion is raised that a larger number of unspecific results are obtained by this than by the other methods.

These conclusions need confirmation and further investigation especially with sera which have been withdrawn some time before test.

II. Flocculation Tests.

1. Comparison of Results of Flocculation Tests with those obtained by the Bordet-Wassermann Test.

The work of the Conference has shown that:

The Flocculation tests cannot at present replace the Bordet-Wassermann test. It must, however, be emphasised that, in the course of the present Conference, they have yielded positive results on a certain number of cases of syphilis in which the Bordet-Wassermann reaction was negative, although the latter test showed itself on the whole to be more sensitive.

It is therefore recommended that the Bordet-Wassermann test and the Flocculation tests be carried out side by side, since by such a combination the best results have been obtained.

2. Comparison of the several Flocculation Tests.

(*a*) *Meinicke's D. M.*

According to the results of the various investigators both before and during the Copenhagen Conference, the D. M. with very few exceptions showed specific results. They were, however, for the most part on the weak side. The weaker results were more marked at the Conference work than in the previous tests.

Further consideration of the D. M. test can now be omitted since the author himself has replaced it by his "Trübungsreaktion", the extract for which is a modification of that used in the D. M.

b) et c) *Réaction de Sachs-Georgi et Sigmaréaction (Dreyer et Ward).*

En ce qui concerne les autres réactions de floculation qui semblent devoir prendre rang dans la pratique, la réaction originale de Sachs-Georgi a donné plus de résultats positifs, au cours de cette Conférence, que la méthode Sigma dans les cas de syphilis avérée, mais aussi, en raison de cette sensibilité plus grande, sa spécificité en a été légèrement influencée.

Pourtant, étant donné que ces résultats ne concordent pas avec ceux obtenus jusqu'ici par quelques laboratoires, il serait désirable d'établir par des travaux ultérieurs laquelle de ces deux méthodes, toutes deux recommandables, donne les meilleurs résultats.

d) *Trübungsreaktion de Meinicke (M.T.R.).*

Comparée à la réaction de Sachs-Georgi, la M.T.R. pratiquée avec la solution de chlorure de sodium à 3 % a donné des résultats concordants, tant au point de vue du nombre de réactions spécifiques qu'au point de vue de la sensibilité, dans les cas des yphilis avérée. Moins sensibles toutes deux dans l'ensemble que la réaction de Bordet-Wassermann, elles ont cependant, comme aussi la Sigma-réaction, donné un résultat positif dans un petit nombre de cas de syphilis à réaction de Bordet-Wassermann négative.

Il est donc recommandable de pratiquer la M.T.R. à côté de la réaction de Bordet-Wassermann au même titre que les réactions de floculation envisagées ci-dessus en raison surtout de la grande simplicité de sa technique.

III.

Les diverses méthodes pour le diagnostic sérologigue de la syphilis ne doivent être pratiquées que par des travailleurs expérimentés et dans des laboratoires spécialement organisés pour ces recherches. On a constaté, en effet, que, quoique les travaux de la Conférence eussent été exécutés dans des conditions spécialement favorables, des expérimentateurs isolés ont obtenu, exceptionnellement, il est vrai, des résultats incorrects avec l'une ou l'autre méthode. De tels résultats ne purent être reconnus que grâce à l'emploi d'un grand nombre de sérums de contrôle. Il y a donc lieu de ne

(*b*) *and* (*c*) *Sachs-Georgi Test and Sigma Test.*

As to the other Flocculation tests which might be useful for routine purposes, the original reaction of Sachs-Georgi has yielded during this Conference more positive results in known cases of syphilis than the Sigma method. But conformably with this greater sensitiveness, its specificity was found to be slightly impaired. Since, however, these findings do not agree with those which have been obtained in certain laboratories, it is advisable to make further investigation in order to discover which of these two recommendable methods gives the better results.

(*d*) *Meinicke Trübungsreaktion* (M. T. R.).

Compared with the Sachs-Georgi Reaktion, the M.T.R. carried out with 3 % saline yielded corresponding results, both as regards specificity and sensitiveness in cases of known syphilis. Both reactions proved somewhat less sensitive than the Bordet-Wassermann test. On the other hand, the Meinicke Trübungsreaktion, like the Sachs-Georgi and the Sigma reaction, yielded in a small number of cases of syphilis more positive results than the Bordet-Wassermann reaction. It is therefore advisable to carry out the M. T. R. in conjunction with the Bordet-Wassermann and the flocculation reactions considered above, particularly so because of the simplicity of this method.

III.

The several methods for the serological diagnosis of syphilis should only be carried out in laboratories specially adapted to the purpose and by experienced workers, as it has been shown that, even under the favourable conditions of the Conference, individual investigators exceptionally obtained incorrect results with one or the other method. Such results were only recognisable through the great number of controls and

procéder aux essais qu'en les accompagnant d'un nombre élevé de contrôles.

Au reste, étant donné que l'appréciation décisive de la valeur des méthodes sérologiques est fournie en dernière analyse par la symptomatologie clinique, il est spécialement recommandé que les *laboratoires qui s'occupent de ces recherches travaillent en liaison étroite avec les services hospitaliers.*

IV.

L'expérience de cette conférence ayant montré que de petites différences dans la technique peuvent provoquer des différences importantes dans les résultats, il importe pour les recherches comparatives ultérieures que la *technique employée soit exactement conforme aux instructions des auteurs des méthodes ou modifiées seulement après entente entre les instituts chargés des études comparatives.*

La Conférence estime à l'unanimité qu'il y a grand intérêt à poursuivre les recherches comparatives dans les divers laboratoires, et les directives ci-après ont été suggérées pour le travail ultérieur.

PROPOSITIONS POUR LES TRAVAUX ULTÉRIEURS

I. — La *réaction* de *Bordet-Wassermann* pratiquée à l'Institut Pasteur de Paris et exécutée à la Conférence par le Dr Mutermilch a bénéficié en cette circonstance, de l'avis de plusieurs expérimentateurs, de conditions de travail spécialement favorables, les sérums étant tous, sans exception, recueillis tout récemment. Il fut décidé, en conséquence, que les instituts qui participent à ces travaux enverraient des échantillons à examiner au Dr Mutermilch et que les résultats seraient communiqués au Dr Madsen, afin de reconnaître les résultats que la méthode peut donner dans les conditions ordinaires de travail.

II. — *Réaction de Sachs-Georgi:* Suggestions du Prof. Sachs:

1. Exécution simultanée de la réaction de S.G. originale et de la réaction suivant la technique ci-après:

a) Utilisation de petites tubes à agglutination;

render it strongly advisable continually to employ numerous control sera. As, however, the final verdict in regard to serological methods is based on clinical investigation, it is to be emphasised that *pathologists who are concerned in such investigations should work in collaboration with the clinician.*

IV.

From the experience obtained at this Conference that small differences in the technique may cause profound differences in results, it is of great importance, in regard to further comparative investigations, that *the technique employed should be strictly in accordance with the directions of the authors of the methods and should only be modified after consultation between the Institutes engaged in the comparative investigations.*

The Conference unanimously agreed as to the importance of continuing these comparative investigations in the several laboratories and the following lines for further work were suggested.

PROPOSALS FOR FUTURE WORK.

I. The *B. W. test* carried out in the *Institut Pasteur,* Paris, and performed by Dr. *Mutermilch* at the Conference, has, in the opinion of several of the investigators, on this occasion had specially favourable working conditions, the sera being without exception freshly collected. It was therefore decided that the institutes participating in the present investigation should send samples to Dr. Mutermilch to be tested, and the results should be communicated to Dr. Madsen, in order that it might be seen what results the method would yield under ordinary circumstances.

II. The *Sachs-Georgi Test:* Suggestions by Professor Sachs.

(1) Performance of the S. G. test in parallel with the following technique:

(*a*) Using small agglutination tubes;

b) 0,2 cc. de sérum + 0,5 de la dilution d'extrait (dilué suivant les prescriptions de S.G.);

c) Pratique comparative de la réaction au thermostat et au bain-marie;

d) Lecture au moyen de l'agglutinoscope d'Oxford, modification de Copenhague.

2. Les extraits de Dreyer-Ward, de Sachs-Georgi et de Renaux seront comparés dans la réaction de S.G. et la modification Sigma. Les extraits doivent être dilués suivant les prescriptions des auteurs, mais les proportions relatives de sérum et de dilution d'extrait doivent être calculées en tenant compte des particularités de la méthode.

3. Il y a lieu de rechercher par des essais comparatifs lequel des extraits signalés au 2) est le plus favorable pour une appréciation quantitative.

4. La réaction Lécithine-Chlorure de Calcium de *Sachs* et *Klopstock* est recommandée comme contrôle d'usage général dans le diagnostic de la syphilis. Les indications seront fournies par Heidelberg.

5. Recherche des conditions optimales de la modification suggérée en 1) en pratiquant l'essai avec des quantités différentes de sérum.

III. — Etant donné que les résultats obtenus à la conférence avec la *Sigmaréaciton* furent fort différents de ceux observés antérieurement, les instituts qui s'occupent spécialement de cette réaction (Bruxelles, Copenhague, Londres et Varsovie) ont formé une sous-commission qui s'est donné pour mission d'élucider cette question, les points suivants ayant retenu son attention:

1. La Sigmraéaction, comme aussi dans plusieurs cas les autres réactions de floculation, s'est montrée inférieure à la réaction de B.W. dans des cas de syphilis traitée et latente et dans des cas de démence paralytique, alors que, dans les divers laboratoires, elle avait donné, pour des cas du même genre des résultats au moins équivalents, sinon supérieurs à ceux de la réaction de Bordet-Wassermann.

2. On cherche à obtenir, en outre, une lecture uniforme des unités Sigma dans les divers laboratoires avec les mêmes sérums.

(*b*) 0.2 ccm. serum + 0.5 ccm. extract dilution (S. G. method of dilution);

(*c*) Incubation in incubator and water-bath — parallel tests.

(*d*) Reading by means of the Copenhagen modification of the Oxford agglutinoscope.

(2) The extracts of Dreyer-Ward, Sachs-Georgi and Renaux to be compared in the S. G. reaction and in the Sigma modification. Whilst the extracts are to be diluted according to the directions of the authors, the relative proportions of serum and extract dilution used are to be adjusted in accordance with the particular method used.

(3) It is to be determined, by means of comparative tests, which of the extracts referred to in 2 is the most suitable for quantitative estimations.

(4) *Sachs and Klopstock's* Lecithin-Calciumchloride reaction is recommended for general use as a control in the sero-diagnosis of syphilis. Directions will be issued from Heidelberg.

(5) Investigation of the optimal conditions for the modification suggested in 1 by trying different amounts of serum.

III. As the results obtained by the Σ *test* at the Conference were strikingly different from those previously observed, the institutes specially engaged in this test (Brussels, Copenhagen, London, Warsaw) formed a sub-committee for the purpose of trying to elucidate the matter, the points for investigation being as follows:

(1) Why the Σ, as in many cases also the other flocculation tests, failed in comparison with B.W. in cases of treated and latent syphilis and D.p., in which, in the individual laboratories, the Σ had given at least equally good, if not better results than the B. W.

(2) To obtain uniform readings of Σ units in different laboratories with the same sera.

3. La mission de la sous-commission étant donc de formuler des suggestions relatives aux *détails techniques* d'exécution de la Sigmaréaction, ces suggestions furent les suivantes:

a) Les sérums et les solutions salines peuvent être répartis dans les tubes au moyen de pipettes de verre qui peuvent être rincées entre les divers échantillons au moyen d'eau salée physiologique. Aucun des réactifs ne peut venir en contact de pièces de métal ou de caoutchouc.

b) Si l'on emploie une réaction éliminatoire préliminaire telle que la M.T.R., le nombre des tubes peut être réduit à deux (2me et 5me) pour les échantillons qui donnent une M.T.R. négative. Cependant, dans un institut donné, il est désirable que l'on continue à pratiquer le premier tube aussi longtemps que l'on n'aura pas déterminé si sa suppression diminue ou non la valeur de la réaction.

c) La cholestérine employée devrait être la même dans tous les instituts chargés de la comparaison ultérieure de la Sigmaréaction modifiée. Cette cholestérine devrait être en suspension identique à celle qui a été utilisée pour la détermination du facteur de suspension de l'extrait et devrait être envoyée d'Oxford avec l'extrait.

d) L'incubation de la Sigmaréaction doit être faite dans un bain-marie découvert, à niveau constant, et où le contenu des tubes en expérience est immergé de la moitié au moins et des 2/3 au plus.

e) Autant de réactions que possible seront pratiquées sur des sérums envoyés d'une ou plusieurs sources à chacun des instituts participant aux recherches de la Sigmaréaction modifiée. La lecture obtenue par chacun des instituts sera communiquée à Copenhague.

f) Tous les instituts participant à l'étude future de la Sigmaréaction devraient faire des recherches en vue de trouver si possible un tube qui, sans diminuer la sensibilité et la valeur de la réaction, puisse être nettoyé et secoué plus facilement que le tube de Dreyer-Ward[1].

[*Ajouté après rédaction.*]

[1] L'infériorité de la réaction Sigma, pendant la Conférence, qui a donné des résultats notablement contraires à ceux constatés avant la

(3) The object of the Sub-Committee was also to frame suggestions on *technical details* in connection with the Sigma test. These suggestions were as follows:

(*a*) Sera and saline may be measured into the tubes with a glass pipette which may be washed out between specimens with physiological saline. None of the reagents should come into contact with either metal or rubber.

(*b*) If a preliminary eliminating test, such as the M.T.R., is employed, the number of tubes can be reduced for those specimens which give a negative M.T.R., to the second and fifth, but in one institute it is advisable that the use of the first Sigma tube should be continued until it is determined whether or not its omission would detract from the value of the test.

(*c*) The cholesterin employed should be the same in all institutes engaged in the further comparison of the modified Sigma test. This cholesterin should be in the identical solution which was used in the determination of the suspension factor of the extract and should be sent out from Oxford with the extract.

(*d*) The conditions of incubation in the Sigma test must be with an open water-bath, the level of water in which is constant and with the tubes immersed so that not more than two-thirds nor less than one-half of the tube contents are submerged.

(*e*) As many tests as possible should be carried out on sera sent to each of the institutes participating in the further investigation of the modified Sigma test from one or more sources. The readings obtained by each of the institutes should be communicated to Copenhagen.

(*f*) Each of the institutes participating in the further investigations of the Sigma test should experiment to discover, if possible, a tube which, whilst not interfering with the delicacy and reliability of the test, can be cleaned and shaken more easily than the Dreyer-Ward tube[1].

[*Addition made after editing.*]

[1] In consequence of the inferiority of the *Sigma reaction* during the Conference, which was in striking contrast to the results previously

Remarque. — Il est particulièrement désirable, en vue d'assurer des lectures strictement comparables, que les travailleurs usent à l'avenir de signes identiques. Les signes ci-dessous, employés à la Conférence de Copenhague, sont recommandés:

++	= réaction fortement positive	= > 3,9 unités Sigma.
+	= » positive	= 1,5 à 3,9 unités Sigma.
±	= » douteuse	= 1,0 à 1,4 unités Sigma.
—	= » négative	= < 1 unité Sigma.

Les communications suivantes furent faites à la Conférence:

Dr Th. Madsen. — Résultats des examens quantitatifs de Sigmaréactions.

Dr E. Renaux. — L'antigène de l'Institut Pasteur de Bruxelles.

Conférence, a donné lieu à un certain nombre de recherches complémentaires qui ont été effectuées à l'Institut de Copenhague par l'Assistant Mörch.

Ces recherches complémentaires semblent avoir donné les résultats suivants:

1. Les extraits qui ont été employés pendant la Conférence n'avaient pas un indice *de suspension* (Suspensionsfaktor) de 1,6, comme Oxford l'avait indiqué, mais bien un indice de suspension de 1,9, d'où il résulte que la valeur des unités Sigma aurait dû être augmentée de 20% environ.

2. Pendant la Conférence, l'*inactivation* des sérums *a eu lieu* dans des tubes hermétiquement fermés par des bouchons de caoutchouc, par conséquent, *sous une certaine pression*. Nous avons constaté que, par ce procédé, les substances qui interviennent lors de la réaction Sigma donnent, dans certains cas, une réaction inférieure de 5 à 20% environ.

3. En adoptant, comme nous l'avions fait observer lors de la Conférence, un procédé contraire aux indications primitives sur la méthode, c'est-à-dire en effectuant la réaction au bain-marie, non pas dans des tubes absolument ouverts, mais dans des tubes plus ou moins fermés, les résultats sont identiques dans certains cas, tandis que, pour d'autres cas, il est à constater un affaiblissement qui peut atteindre 500%.

4. Un certain nombre de cas de paralysie progressive, qui avaient subi une inoculation de malaria, ont donné une réaction de floculation singulièrement faible. A la suite d'une étude approfondie, nous avons pu constater que le traitement malarique provoque une activation bien plus forte des réactifs pour les réactions de fixation du complément que la réaction de floculation.

Les détails seront publiés prochainement.

Note: It is particularly requested, in order to secure strictly comparable readings, that investigators should in future use similar hieroglyphics. The following, as used at the Copenhagen Conference, are recommended:

## strong positive	= > 3.9	Sigma units in 20 hours
+ positive	= 1.5—3.9	" " "
± doubtful	= 1.0—1.4	" " "
− negative	= < 1	" " "

The following communications were made to the Conference:

Dr. Th. Madsen: Results of quantitative Σ test.

Dr. E. Renaux: L'antigène de l'Institut Pasteur de Bruxelles.

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obtained, a series of subsequent researches was undertaken by *Dr. Mörch* at the Copenhagen Institute.

The results of these researches seem to be as follows:

1. The *suspension index* of the extract used at the Conference was not 1.6, as had been stated at Oxford, but 1.9; accordingly, the value of the Sigma units ought to have been increased by about 20 %.

2. During the Conference, the sera were *rendered inactive* in tubes hermetically sealed with rubber stoppers, that is to say, under a *certain pressure.* As a result, the reactive capacity of the active substances in the Sigma reaction was in some cases reduced by approximatively 5-20 %.

3. The adoption at the Conference of a method which differed considerably from that originally laid down (the reaction was not applied in an entirely open water-bath but in a more or less closed one) produced results which were in some cases the same but in others were reduced by about 500 %.

4. In a number of cases of progressive paralysis treated with malaria, the flocculation reaction proved decidedly inferior. As a result of a closer investigation, it was found that by this treatment the reagents were rendered much more active for complement-fixation reactions than for flocculation reactions.

Details will be published later.

Ces communications sont insérées à l'annexe II avec une note du Dr Wyler.

Pendant la Conférence, le professeur Müller démontra sa technique pour le B.W. et le Dr Jersild, du Rudolph Bergh's Hospital, démontra son système d'enregistrement des syphilitiques basé sur la réaction de B.W. exécutée à l'Institut de l'Etat à Copenhague.

Des télégrammes furent envoyés au professeur Bordet et au professeur von Wassermann.

These communications are contained in Annex II, together with a note by Dr. Wyler.

During the Conference Professor MÜLLER demonstrated his B. W. technique and Dr. JERSILD, Rudolph Bergh's Hospital, demonstrated his system of registration of syphilitic patients based on the B. W. tests, performed in the State Institute, Copenhagen.

During the Conference, telegraphic greetings were sent to Professor BORDET and Professor von WASSERMANN.

ANNEXE I.

ANNEX I.

Rapports par:
Reports by:

1. Colonel HARRISON.
2. Professor HIRSZFELD.
3. Dr. MADSEN.
4. Professor MÜLLER.
5. Dr. RENAUX.
6. Professor SACHS.

1.

COMPARISON OF WASSERMANN, SACHS-GEORGI AND SIGMA TESTS.

Report by Colonel L. W. Harrison.

The following are the results obtained in this investigation:

A. From the date of rendering first report November, 1922, to September 17th, 1923;

B. From the commencement of the investigation.

Further investigation has made it necessary to correct some of the figures in the first report and in the interim report submitted September 18th, 1923.

The actual tests were conducted by Dr. E. J. Wyler, who was not aware of the nature of the cases providing the sera until after completion of all the tests included in this report. The other conditions of testing were as reported to the Conference in November 1922. In all cases where the results of the tests appeared to disagree with the clinical findings, further investigations were made and the sera frequently submitted again for testing without Dr. Wyler's knowledge. In certain cases where the history and signs of syphilis were negative, further investigation established a diagnosis of syphilis.

TABLE I (SERA).

Untreated Cases	A. Results obtained from report submitted to Conference in Paris, November, 1922, to September 17th, 1923							B. Totals of results from commencement to September 17th, 1923						
	Total cases	Positive			Doubtful			Total cases	Positive			Doubtful		
		W. R.	S.G. R.	Sig-ma	W. R.	S.G. R.	Sig-ma		W. R.	S.G. R.	Sig-ma	W. R.	S.G. R.	Sig-ma
(1) S. I.	114	50	47	49	13	6	11	127	55	53	56	15	7	11
(2) S. II. . .	76	75	73	74	—	1	—	93	92	90	91	—	1	—
(3) S. III.. . .	42	37	39	41	3	1	1	57	48	51	53	4	3	1
(4) Latent S. .	27	26	25	27	1	—	—	49	42	46	47	5	1	—
(5) Congenital S.	20	10	11	11	6	—	—	22	12	13	13	6	—	—
(6) Cerebro-spinal S. excluding tabes and general paresis. . .	10	6	8	9	2	—	1	11	7	9	10	2	—	1
(7) Tabes . .	12	10	9	10	1	2	1	16	13	12	14	2	2	1
(8) D.p.. . . .	2	1	2	2	1	—	—	2	1	2	2	1	—	—
(9) Total untreated S. .	303	215	214	223	27	10	14	377	270	276	286	35	14	14
(10) Total treated S. Analyses in Table II .	921	286	358	365	133	63	62	1324	403	560	574	195	105	84
(11) Total S... .	1224	501	572	588	160	73	76	1701	673	836	860	230	119	98
(12) Controls . .	318	—	2	—	27	22	5	539	9	15	13	32	37	9

TABLE II (SERA).

Analysis of Treated Cases shown at (10) *in Table I.*

Treated cases	A. Results obtained from report submitted to Conference in Paris, November, 1922, to September 17th, 1923							B. Totals of results from commencement to September 17th, 1923						
	Total cases	Positive			Doubtful			Total cases	Positive			Doubtful		
		W. R.	S.G. R.	Sig-ma	W. R.	S.G. R.	Sig-ma		W. R.	S.G. R.	Sig-ma	W. R.	S.G. R.	Sig-m
(1) S. I. . . .	236	19	29	27	23	9	7	309	24	37	33	25	17	1
(2) S. II. . . .	148	33	38	44	23	14	7	227	49	67	74	30	20	1
(3) S. III.. . .	139	87	96	95	15	7	10	235	132	166	165	32	14	1
(4) Latent S. .	233	98	131	137	41	18	22	335	119	185	197	63	32	2
(5) Congenital S.	96	18	22	18	10	10	9	113	28	36	34	15	12	
(6) Cerebro-spinal S. excluding tabes and general paresis. . .	28	8	13	14	11	3	4	40	14	20	22	14	5	
(7) Tabes . .	38	22	27	29	9	2	2	59	34	44	45	14	5	
(8) D.p.. . . .	3	1	2	1	1	—	1	6	3	5	4	2	—	
Total treated S. as in (10) in Table I. . . .	921	286	358	365	133	63	62	1324	403	560	574	195	105	

TABLE III (SERA).

Showing positive results in treated and untreated cases of syphilis and in controls, counting doubtful results as negative in untreated cases of syphilis and controls and as positive in treated cases of syphilis.

	A. Results obtained from report submitted to Conference in Paris, November 1922 to September 17th, 1923				B. Total of results from commencement to September 17th, 1923			
	Total Cases	Positive			Total Cases	Positive		
		W R.	S. G. R.	Sigma		W. R.	S. G. R.	Sigma
S. untreated	303	215	214	223	377	270	276	286
S. treated .	921	419	421	427	1324	598	665	658
Total S.. .	1224	634	635	650	1701	868	941	944
Controls . .	318	—	2	—	539	9	15	13

TABLE IV (SPINAL FLUIDS).

	A. Results obtained from report submitted to Conference in Paris, November 1922 to September 17th, 1923							B. Totals of results from commencement to September 17th, 1923						
	Total Cases	Positive			Doubtful			Total cases	Positive			Doubtful		
		W. R.	S.G. R.	Sig-ma	W. R.	S.G. R.	Sig-ma		W. R.	S.G. R.	Sig-ma	W. R.	S.G. R.	Sig-ma
SI., II., III . . .				Nil							Nil			
Latent S.				»							»			
Congenital S. . .	1	1	1	1	—	—	—	1	1	1	1	—	—	—
Cerebro-spinal S. excluding tabes and general paresis	1	1	1	1	—	—	—	1	1	1	1	—	—	—
Tabes	—	—	—	—	—	—	—	1	1	1	1	—	—	—
D.	12	12	11	10	—	1	1	15	15	13	12	—	2	1
Total treated S.	14	14	13	12	—	1	1	18	18	16	15	—	2	1
Total untreated S. (1 case of D.p.)	1	1	1	1	—	—	—	1	1	1	1	—	—	—
Total S.	15	15	14	13	—	1	1	19	19	17	16	—	2	1

3. *Controls* were cases in which no clinical evidence of syphilis could be discovered, even though the results of the serum tests make it more than probable that some were, in fact, syphilitic.

(*a*) Nine cases (10), (464), (501), (618), (675), (206), (25), (589), (221), positive to W. test were also positive to S. G. and Sigma and were probably syphilitic.

(*b*) One other case (1840) included amongst controls in an interim return has been further investigated, and the history indicated that this patient is suffering from congenital syphilis. The serum of this patient was tested a number of times and gave the following reactions.

Dates	W. R.	S. G.	Sigma units
(1783) February 9th, 1923	±	—	1.0
(1840) February 16th, 1923	+±	—	0.94
(1912) February 26th, 1923	±	—	0.94
(1955) March 5th, 1923	—	—	0.94
(2252) April 18th, 1923	±	—	0.62
(2419) May 28th, 1923	±	—	0.94
(2607) July 9th, 1923	—	—	0.0

In another laboratory, by the same method of Wassermann test, the serum gave ++: +: —: ±: —: —: —.

(*c*) Of the 15 cases giving positive S. G. reactions, nine have been explained under (*a*).

The six remaining cases were as follows:

No. 95. Gonorrhœa. Gave S. G. +++; negative W.R.; 1.5 Sigma units (20 hours). Retested one month later gave negative W. R.; doubtful S. G. and 1.3 Sigma units (21 hours).

No. 614. Gonorrhœa. Gave S. G. ++; negative W. R.; 0.62 Sigma units (44 hours).

No. 2379. No disease. Gave S. G. ++; negative W. R.; and 0.0 Sigma units.

No. 685. Gonorrhœa. Gave S. G. ++++; doubtful W. R.; and 3.7 Sigma units. Probably syphilis.

No. 736. "Albuminuria." History of gonorrhœa 18 years ago. Gave S. G. +++; doubtful W. R.; and 3.0 Sigma units. Probably syphilis.

The S. G. results in cases (95) and (614) were obtained with one extract only, and the test should have been repeated.

No. 2675. A case of arthritis. History of a sore 30 years previously. Six children died of tuberculosis. Two children by second wife alive and well. Gave S. G. +; W. R. negative. Sigma 0. Retested five days later, gave S.-G., W. R. and Sigma, all negative.

(*d*) Of the 13 cases giving positive Sigma reactions, nine have been explained under (*a*). Of the four remaining, two (685 and 736) were probably syphilitic as explained under (*c*). The remaining two were:

No. 373. Balanitis (possibly primary syphilis but patient disappeared). W. R. negative; S. G. doubtful; Sigma 6.8 (20 hours).

No. 394. No signs of disease. W. R. negative; S. G. doubtful; Sigma 1.6 (20 hours).

In three other cases (not included in above tables because S. G. test failed) Sigma was positive but W. R. negative. These were:

No. 483. Which gave 2.5 Sigma units (21 hours) and two months later, as (799) gave 0.0 units (44 hours), with negative W. R. and S. G.

No. 485. Which gave 2.5 Sigma units (21 hours) and one month later, as (733), gave 0.0 units (44 hours), with negative W. R. and S. G.

No. 574. Which gave 2.5 Sigma units and three months later, as (1160), gave 0.7 units, with negative W. R. and S. G.

Summary.

Of the cases included in the above tables the possibly non-specific results are:

W. R. None.

Three S. G. (In two of these the test should have been repeated, as the reaction was given with one extract only.)

One other case (2675) may possibly have been syphilitic, but the repeated test gave a negative S. G.

One Sigma.

Comparative Delicacy.

Compared in respect of delicacy, the percentages of positives to each test were:

	W.R.	S.G.R.	Sigma
Untreated cases	71.6	73.2	75.9
Treated „	45.2	50.2	49.7

showing generally a larger percentage of positives by the flocculation tests. The difference between the Wassermann test and the flocculation has become considerably less since the first report was rendered.

Agreement of Results.

Results of tests on sera from 377 untreated cases and 1,324 treated cases of syphilis.

All three tests agreed.

	Prim.	Sec.	Tert.	Cerebro-spinal (including tabes & D.p.)	Congen.	Latent	Tabes	D.p.	Total Syphilis
Untreated Cases — positive	42	90	45	7	11	40	10	1	246
Untreated Cases — negative	59	1	2	1	8	1	1	—	73
Treated Cases — positive	29	64	150	19	35	155	41	5	498
Treated Cases — negative	236	122	42	6	59	81	4	1	551

That is total agreement of all three tests in 84.6 per cent. of untreated cases and in 79.2 per cent. of treated cases. This is 0.9 per cent. higher in the untreated cases and 5.1 per cent. in the treated than as shown in the first report.

Sigma and S. G. positive with W. R. negative.

	Prim.	Sec.	Tert.	Spinal and Cerebral (excluding Tabes & D.p.)	Cong.	Latent	Tabes	D.p.	Total Syphilis
Untreated	6	0	4	2	2	5	1	1	21
Treated	7	12	19	3	4	43	4	0	92

Sigma positive with S. G. and W. R. negative.

Untreated	2	0	1	1	0	0	1	0	5
Treated	5	5	2	2	0	13	1	0	28

Sigma W. R. positive with S. G. negative.

Untreated	6	1	3	0	0	2	2	0	14
Treated	4	3	7	2	3	15	3	0	37

W. R. and S. G. positive with Sigma negative.

Untreated	0	0	0	0	0	0	1	0	1
Treated	4	2	3	2	2	5	2	0	20

W. R. positive with S. G. and Sigma negative.

Untreated	7	1	0	0	1	0	0	0	9
Treated	12	10	4	5	3	7	2	0	43

S. G. positive with W. R. and Sigma negative.

Untreated	5	0	2	0	0	1	0	0	8
Treated	12	9	8	1	7	16	2	0	55

INCUBATION, IN SACHS-GEORGI TEST, FOR FORTY-EIGHT HOURS.

At the Paris Conference of November 1922, it was suggested that incubation for 48 hours might be tried in the Sachs-Georgi test. A series of 771 sera were dealt with from this aspect in two groups *A* and *B*.

A. 229 sera were replaced in the incubator for a further 24 hours after the initial 24-hour reading, positives as well as negatives. Two cases which were doubtful in 24 hours became positive (++) in 48 hours:

No. 1214. W. R. and Sigma doubtful. A treated case of syphilis.

No. 1328. W. R. negative; Sigma doubtful. A treated case of syphilis.

One case which was doubtful in 24 hours became stronger but still doubtful in 48 hours:

No. 1283. W. R. positive; Sigma positive. A treated case of syphilis.

One case which was negative in 24 hours became doubtful in 48 hours:

No. 1201. W. R. and Sigma negative. Control gonorrhœa. No history of syphilis.

Two cases which were doubtful in 24 hours became negative in 48 hours:

No. 1220. W. R. negative; Sigma doubtful. A treated case of syphilis.

No. 1690. W. R. positive; Sigma negative. Congenital syphilis.

Of the remaining 223 cases, 27 which were positive in 24 hours became more strongly positive in 48 hours. Of the 196 cases which then remained:

147 were negative in 24 and 48 hours.
45 were positive or doubtful in 24 and 48 hours. (No change.)
3 were infected in both tubes in 48 hours.
1 had an unsatisfactory serum control.

B. In this series of 542 sera, the positives were not incubated beyond 24 hours. Incubation was continued to 48 hours in 276 negative cases.

Out of these 276 cases, 219 which were negative at 24 hours were also negative at 48 hours. In view of what follows it has been thought unnecessary to set out an analysis of these cases. Eight which were doubtful at 24 hours were unchanged at 48 hours, whilst seven which were doubtful at 24 hours were negative at 48 hours. Two of these were controls, no diseases and herpes respectively; the remaining five were treated cases of syphilis. Out of 42 cases which were negative or doubtful at 24 hours, 18 became weakly positive (+) and one became ++ at 48 hours. Fifteen of these were treated cases of syphilis, but in four others the

positive result (+) was probably non-specific. They were as follows:

No. 1990. Control urethritis. W. R. and Sigma negative. Previously tested as No. 1723 S. G., 24 and 48 hours, W. R. and Sigma were negative.
No. 1924. Control case. No venereal disease. W. R. and Sigma negative.
No. 2216. Control gonorrhœa. No history of syphilis. W.R. and Sigma negative.
No. 2239. Ulcer of leg. W. R. and Sigma were negative.

Of the fifteen treated cases of syphilis mentioned above eleven were negative by W. R. and Sigma; one gave a doubtful W. R. (±) with negative Sigma; two gave a negative W. R. with positive Sigma (3.2 and 3.9 units at 20 hours respectively) and one gave a strong positive W. R. (++) and strong positive Sigma (19.2 units).

The remaining 23 which were negative at 24 hours out of a total of 42 which were negative or doubtful at 24 hours became doubtful at 48 hours. Thirteen were treated cases of syphilis but ten were controls and were negative by W. R. and Sigma. They were as follows:

No. 1806. No disease.
No. 2145. Gonorrhœa
No. 2147. Gonorrhœa
No. 2150. No disease } occurred in one group of tests.
No. 2153. Gonorrhœa
No. 2160. Ptosis
No. 2176. Soft Chancre.
No. 2245. Gonorrhœa.
No. 2271. Gonorrhœa.
No. 2284. Gonorrhœa.

From the facts set out above, it would seem that incubation of the S. G. test beyond 24 hours is of doubtful utility. Sera which are going to give a true positive reaction do so with rare exceptions within 24 hours, while continuance of incubation beyond this period tends to produce slight non-specific flocculation.

Infection on Prolonged Incubation.

Up to 24 hours incubation the occurrence of infection in the S. G. test was exceedingly rare, and may be said to be negligible.

Beyond 24 hours, however, it occurred:

In Series *A* (both positives and negatives continued to 48 hours; 229 sera) in 16.1 % in one tube, and 1.3 % in both tubes.

In Series *B* (negatives only continued to 48 hours; 276 sera) in 11.9 % in one tube, and in 3.2 % in both tubes.

REMARKS ON SOME TECHNICAL DETAILS.

By Dr. E. J. Wyler.

(The clinical details were not ascertained until after completion of all the tests in this report.)

Serum controls in the Sigma Test:

At the Paris Conference of November 1922 it was suggested that serum controls might be put up if desired.

One thousand serum controls have been tried in two series, *A* and *B*, each consisting of five hundred cases.

The *A* control consisted of 20 drops serum + 6 drops 96 % alcohol diluted 1 in 11.7 with normal saline.

The *B* control consisted of 10 drops serum + 15 drops 96 % alcohol diluted to 3 % with normal saline.

A. The five hundred cases included five cerebro-spinal fluids. 300 (=60 %) of the controls showed a certain degree of flocculation, or query flocculation, but, for the most part, this was slight — either *tr*— or *tr*. ? — both as regards the 20-22 and the 40-44 hours incubation.

Actually 105 serum controls out of the 500 cases showed more than *tr*— (=21 %). Out of these,

92 (=18.4 % in 500) did not show more than *tr*;
12 (=2.4 % in 500) did not show more than *tr*+;
1 (=0.25 % in 500) did not show more than *S*+.

The S+ case was a strongly positive cerebro-spinal fluid (Sigma units 19.2; W. R. ++++; S. G. strong positive) which had shown no suspended particles before incubation (No. 1815).

In seventeen (negative) cases the flocculation at 20 hours had become less marked in 40 hours. In others, however, it either remained stationary, or became more marked in 40 hours.

But it is to be observed that no cases among the 500 tested which showed flocculation in the serum control yielded a non-specific positive reading.

It was not possible to establish any relationship between strength of reaction and flocculation in the serum control; indeed, in some cases where the serum control has shown as much as *tr* or *tr*+ the corresponding tube in test proper has been negative. This is possibly due to the flocculation being masked in the corresponding tube of the test proper, by the cloudy extract dilution.

It may be remarked that in three cases only, in which the Sigma serum control showed some degree of flocculation was the S. G. serum control unsatisfactory (Nos. 2112, 2118, 2152).

B. The five hundred cases included two cerebro-spinal fluids. 51 (=10.2 %) of the controls showed a certain degree of flocculation or query flocculation.

In 14 this was slight — not more than *tr.*— 37 cases showed more than *tr*— (=7.4 %). Out of these,

20 (=4 % in 500)	did not show	more than	*tr.*
15 (=3 % in 500)	,,	,,	*tr*+
1 (=0.2 % in 500)	,,	,,	*S*—
1 (=0.2 % in 500)	,,	,,	*S*+

The *S*— case (at 21 hours) was negative with all tests and showed no flocculation in the corresponding tube of the test proper. At 44 hours the reading in the serum control tube was *tr* (No. 1357).

The *S*+ case was positive with all tests and showed flocculation in the corresponding tube of the test proper (No. 1325). In this series of controls, the only instance of the

flocculation lessening with prolonged incubation is the one (No. 1357) quoted above.

As in series *A*, no cases which showed flocculation in the serum control yielded a non-specific positive reading, and similarly no apparent relationship could be established between strength of reaction and flocculation in serum control.

In one case only, in which the Sigma serum control showed some degree of flocculation (*tr*+ at 44 hours; nil at 21 hours) was the S. G. serum control unsatisfactory (No. 1366).

It is to be noted that there is a marked contrast between the number of flocculating serum controls in *A* and *B* (*A* = 60 %. *B* = 10.2 %).

In so far as a conclusion may be drawn from the thousand cases included under *A* and *B*, it would seem that a serum control in the Sigma test is of doubtful value. Moreover, from a practical point of view, a considerable additional quantity of serum is needed for the *A* technique and half this additional quantity for the *B*.

2.

DEUXIÈME RAPPORT RELATIF AUX RÉACTIONS DE FLOCULATION EN CAS DE SYPHILIS

exécutées sous la direction de L. Hirszfeld, avec la collaboration clinique de MM. B. Feigin et B. Staszynski,

par M^me^ *Sophie Milinska.*

Depuis la dernière Conférence de Paris, 5.467 cas ont été examinés d'après les méthodes de Bordet-Wassermann et de Sachs-Georgi. Dans 965 cas, les réactions de Wassermann, Sachs-Georgi et Dreyer-Ward ont été appliquées; dans 1.010 cas, celles de Wassermann, Meinicke (3^me^ modification) et Sachs-Georgi; 1.097 cas ont été examinés d'après les méthodes de Wassermann, Meinicke (avec baume) et Sachs-Georgi, et 510 cas, selon celles de Wassermann, Dold, Sachs-Georgi.

Le tableau N° I contient un relevé de tous les cas dans lesquels les réactions de Wassermann et Sachs-Georgi ont été employées; les résultats ont été indiqués sous la forme que nous avons définitivement adoptée, c'est-à-dire en faisant ressortir dans quelle mesure le résultat était positif. Le tableau ne comprend pas les cas de carcinome et de tuberculose qui font l'objet du relevé N° II. Depuis que nous employons notre extrait propre N° 37 (depuis le mois d'avril), de nombreux cas de carcinome et de tuberculose ont donné des réactions positives qui ont nécessité la création d'une colonne spéciale.

Les réactions ont été effectuées avec nos propres antigènes. Afin d'établir une comparaison, les réactions ont été répétées, de temps à autre, avec les antigènes originaux.

Le tableau N° III contient un relevé de tous les cas qui ont été examinés simultanément d'après la méthode de Dreyer-Ward; il est établi sous la forme qui avait été indiquée par le professeur Madsen.

Les tableaux N^os^ IV et V font ressortir quelques détails complémentaires relatifs aux cas pour lesquels les trois méthodes n'avaient pas donné de résultats concordants.

Pour la méthode Sigma, nous ne nous sommes généralement servis que des 5 premiers tubes. Conformément à la première communication de Dreyer-Ward, les résultats ont été considérés comme douteux lorsque 1½ à 4 unités ont été constatées. Il est vrai que, dans leurs derniers ouvrages, les auteurs indiquent que jusqu'à 1½ unité, les résultats doivent être considérés comme positifs, et douteux seulement lorsqu'il y a moins de 1½ et jusqu'à l'unité. Nous n'avons pas tenu compte de cette proposition, étant donné que les réactions de contrôle que nous avons pratiquées sur des personnes saines et spécialement sur des nourrices, ont quelquefois fait ressortir jusqu'à 4 unités, comme l'indique le tableau.

Le tableau N° III permet de conclure que, chez les syphilitiques non traités, la méthode Sigma donne, en général, les mêmes résultats que celle de Wassermann. Il est vrai que quelques cas qui, d'après Wassermann, étaient négatifs, ont donné des résultats douteux d'après la méthode de Dreyer et sont ainsi positifs dans une mesure quelque peu supérieure. D'autre part, un certain nombre de cas qui, d'après Wassermann, sont positifs, n'ont donné qu'une réaction douteuse par la méthode Dreyer-Ward. Lorsque le malade a suivi un traitement, la méthode Sigma donne, sans aucun doute, des résultats plus exacts: 168 cas ont été négatifs d'après la méthode de Wassermann, tandis que la méthode de Dreyer n'a donné un résultat négatif que pour 123 cas. La différence principale entre les deux méthodes résulte du fait que la réaction pratiquée pour des malades qui ont suivi un traitement médical, donne très souvent 1½ à 4 unités. Cette exactitude supérieure de la réaction ne paraît pas être due à des avantages spéciaux que présenteraient les réactions de précipitation en général, mais plutôt au fait que la limite entre les cas qui, au point de vue sérologique, sont considérés comme « sains » et « malades », a été fixée à un niveau très bas. Parmi les différentes réactions de contrôle que nous avons effectuées, 46 ont révélé 1½ à 4 unités et 6, un chiffre légèrement supérieur à 4 unités. Il est difficile d'indiquer pour quelles raisons les auteurs anglais ont considéré ce nombre très faible d'unités comme suffisamment caractéristique; il se peut que les cholestérines qui ont été ajoutées aient été différentes. Nous tenons à signaler que, parmi les cas qui étaient

négatifs d'après Wassermann, et douteux selon la méthode de Dreyer, il y avait 17 nourrices absolument saines qui ont été examinées peu de temps après l'accouchement; parmi les six cas de contrôle pour lesquels la méthode de Dreyer a donné un résultat positif, il y avait deux nourrices saines.

Le tableau N° III *a* contient un relevé des résultats des réactions pratiquées sur des nourrices. La réaction de Wassermann a révélé 2 cas positifs; celle de Sachs-Georgi 4 cas; la méthode Sigma a donné 20 résultats « douteux » ou « positifs ». Parmi ces nourrices, la proportion des cas douteux ou positifs est tellement élevée, d'après la méthode de Dreyer-Ward, qu'il faut supposer que le titrage quantitatif obtenu au moyen de la réaction Sigma révèle très facilement le fait que, chez les femmes en couches, les globulines sont extrêmement labiles.

En excluant de la statistique les résultats obtenus chez des nourrices, nous n'avons constaté, dans nos opérations de contrôle, que 4 cas positifs avec un nombre très minime d'unités Sigma; ce dernier s'est élevé à 4,7 dans deux cas, à 5,5 dans le troisième cas et à 9,4 dans le quatrième cas. Le nombre des réactions de contrôle qui ont donné des résultats positifs n'est ainsi pas plus élevé que celui obtenu au moyen de la réaction de Wassermann. A la condition de ne pas fixer à un niveau trop bas la limite jusqu'à laquelle la méthode Sigma pourra être utilisée en vue de l'établissement du diagnostic, la spécificité de cette méthode est égale à celle de la réaction de Wassermann.

Les réactions que nous avons effectuées au cours de cette année ont confirmé nos constatations antérieures qui avaient fait ressortir, pour la syphilis, une certaine concordance entre les résultats des réactions B.W. et S.G. Dans 7 % des cas les résultats ne concordaient pas, même lorsque nous avons utilisé nos antigènes dans les conditions les plus favorables; le nombre de cas pour lesquels la méthode Bordet-Wassermann a donné un résultat positif, tandis que la réaction Sachs-Georgi était négative, est à peu près compensé par un nombre égal de cas négatifs d'après la méthode Sachs-Georgi et positifs selon la réaction Bordet-Wassermann.

A un double point de vue, la réaction Sachs-Georgi a donné cette année-ci des résultats moins satisfaisants. En

premier lieu, nous avons observé que les extraits deviennent trop labiles et ne donnent finalement plus de réaction spécifique. Les extraits qui nous étaient parvenus le 1er août ont perdu leurs propriétés spécifiques après plusieurs mois. Au moyen de l'antigène No 37 que nous employons depuis le mois d'avril, nous avons en outre obtenu des résultats nettement positifs pour des cas de carcinome et de tuberculose. A ce point de vue, la méthode Sigma a été plus satisfaisante que la réaction Sachs-Georgi primitive. Des analyses spéciales ont prouvé que cette supériorité n'est pas due à la plus grande stabilisation des globulines résultant d'une inactivation prolongée, mais plutôt à la nature spéciale des extraits utilisés.

Le procédé de préparation des extraits d'organes desséchés, ne contenant aucune substance soluble dans l'eau, ou l'absence de cholestérine qu'on ajoute à ces extraits immédiatement avant de les utiliser, semble par conséquent présenter certains avantages pour l'application des réactions de précipitation. Les extraits semblent ainsi conserver plus longtemps leurs propriétés et réagir d'une manière plus spécifique en cas de syphilis.

Conformément aux décisions de la Conférence de Paris, nous avons étudié les diverses autres différences que présentent les deux méthodes de la réaction de précipitation. 225 sérums ont fait l'objet de deux séries de réactions: la première au bain-marie, les tubes étant immergés aux deux tiers; la seconde série à l'étuve. 169 sérums ont donné un résultat négatif ou des résultats positifs, identiques au point de vue quantitatif. Dans 26 cas, le titrage a été supérieur à celui au bain-marie et dans 30 cas à l'étuve. Les différences au point de vue du titrage sont donc insignifiantes. Il faut toutefois faire remarquer qu'au bain-marie les flocons sont souvent plus épais, même lorsqu'un titrage plus élevé est obtenu au moyen de l'étuve. Peut-être le fait que le liquide circule dans les tubes immergés jusqu'aux deux tiers de leur longueur favorise-t-il la formation de flocons plus épais en les réunissant en une masse plus compacte, tandis qu'au contraire les flocons légers s'éloignent les uns des autres. Ces différences techniques présentent du reste peu d'importance.

Les effets des différences de la durée de l'inactivation ont été étudiés pour 143 sérums. 124 sérums ont donné un résultat négatif ou la même quantité de précipités; dans 19 cas, des différences ont été constatées au point de vue quantitatif; dans 5 cas, l'inactivation d'une durée d'une demi-heure et dans 14 cas celle d'une durée d'une heure et demie ont donné des résultats plus favorables. Les différences quantitatives sont insignifiantes et les résultats sont ou « négatifs-douteux » ou « douteux-faiblement positifs », etc. La floculation est plus forte après 48 heures qu'après 24 heures. Nous avons constaté un total de 65 cas de syphilis qui, après 24 heures, avaient donné un résultat négatif ou douteux, tandis qu'après 48 heures, la réaction était douteuse ou positive. Pour 12 réactions de contrôle et pour 7 réactions effectuées avec du sang de nourrices, nous avons également obtenu des résultats plus nets. En constatant deux fois les résultats, la réaction devient plus nette, mais elle est plus difficile à exécuter et devient même dangereuse pour les cas de contrôle douteux. Les chiffres indiqués dans notre rapport ont été obtenus conformément aux instructions de Dreyer, c'est-à-dire que les résultats négatifs et douteux n'ont été constatés qu'après 48 heures.

Nous avons signalé, dans notre premier rapport, que l'antigène de Sachs est plus labile que celui de Dreyer-Ward, de sorte qu'il donne un précipité plus fort d'après les procédés quantitatifs de la méthode Sigma. En utilisant une quantité de 0,5 d'antigène de Sachs-Georgi, dans les tubes établis conformément aux prescriptions de Dreyer-Ward, on constate souvent dans les deux ou trois premiers tubes, des précipités complets, tandis que les réactions de Sachs-Georgi ou de Dreyer-Ward, effectuées conformément aux indications des inventeurs de la méthode, donnent des résultats négatifs. La quantité très élevée de précipités que nous avons constatée en employant des sérums des cas de carcinome ou de tuberculose, est également due à des rapports quantitatifs d'une nature spéciale, qui existent entre l'antigène et le sérum en question. Après une inactivation plus longue, etc., la propriété de ces sérums de produire des précipités non spécifiques ne disparaît nullement; elle apparaît également lorsque la réaction est effectuée d'après le procédé de Dreyer, mais avec de l'antigène

de Sachs. Dans ce cas, on constate souvent des « zones de précipités » très irrégulières; c'est ainsi que nous avons obtenu les résultats suivants, en employant le sérum carcinomateux:

Wassermann	Sachs-Georgi 0,2	Dilution d'après Dreyer					
		—	—	—	—	—	Antigène de Dreyer
—	+++	T	St	—	T—	St—	» nº 37 de Sachs-Georgi

La dilution employée dans la méthode de Sachs-Georgi se place entre le 4e et 5e tube environ; elle est donc comprise dans la « zone de précipités ».

Il nous est par conséquent permis de dire que la différence entre la méthode primitive de Sachs-Georgi et la technique de Dreyer-Ward est due aux propriétés spéciales des antigènes utilisés. Par suite du manque de substances solubles dans l'eau et de matières grasses, l'antigène paraît conserver plus longtemps ses propriétés et se décomposer moins facilement. Les extraits étant plus labiles, Dreyer-Ward emploie une quantité supérieure de sérum et arrive ainsi, semble-t-il, à éviter les précipités non spécifiques.

La dilution des extraits, d'après le procédé de Dreyer-Ward nous paraît contribuer à obtenir des résultats d'une plus grande régularité.

Les observations ci-dessus s'appliquent au cas où les quantités exactes prescrites par les auteurs de cette technique sont employées. Les antigènes Sigma font facilement apparaître des zones dans lesquelles aucune précipitation ne se produit ou des séries irrégulières, ce qui nous a obligés à utiliser plusieurs tubes.

D'autre part, la limite entre les réactions positives et négatives ne doit pas être fixée, pour le diagnostic, à un nombre d'unités inférieur à 4, de sorte qu'il nous paraît possible de supprimer le tube α. En ce qui concerne les nourrices, les résultats de la méthode ne doivent jamais être considérés comme absolument exacts.

En outre, nous avons examiné 110 cas par la méthode de Meinicke, troisième modification; dans 92,4 % des cas, les résultats ont été concordants; les réactions correspondantes,

d'après la méthode de Sachs-Georgi, ont donné des résultats concordants dans 94,5 % des cas. Tous les cas non concordants, sauf un seul, étaient positifs d'après Wassermann et négatifs d'après Meinicke, de sorte que les résultats de cette année nous ont également amenés à penser que la troisième modification, bien que spécifique, ne donne pas des réactions suffisamment exactes. Nous avons également examiné 1097 cas, d'après le dernier procédé indiqué par Meinicke, en utilisant le baume canadien. Sur ces 1097 réactions, 549 avaient donné des résultats positifs ou faiblement positifs d'après Wassermann, parmi lesquels la méthode de Meinicke a fait ressortir 70 cas négatifs; sur 548 cas qui, d'après Wassermann, étaient négatifs, 112 ont donné des résultats positifs ou faiblement positifs. Dans 16,5 % des cas, les résultats n'étaient donc pas concordants; signalons toutefois que, pour les mêmes cas, la méthode de S.G. a également donné des résultats contradictoires. Parmi les réactions de contrôle effectuées par la méthode de Meinicke (avec baume) et qui, d'après Wassermann, étaient négatives, nous avons constaté un cas de polypes du nez, un cas de contusion cérébrale, un cas de rhinite qui, selon Meinicke, ont été +++; le même résultat a été obtenu par une réaction effectuée avec le sang d'une nourrice. Par contre, 5 cas de carcinome et 2 de tuberculose qui, d'après la méthode de Sachs-Georgi, étaient +++, ont donné, selon Meinicke (avec baume), des résultats négatifs. Nous avons toujours effectué la lecture des réactions après 24 heures; les résultats ne nous paraissaient pas aussi nets lorsque nous procédions à la lecture avant l'expiration de ce délai. Bien qu'il ne nous soit pas possible de formuler un jugement définitif au sujet des méthodes qui utilisent le baume, il nous paraît toutefois utile de mentionner que la lecture des réactions est extrêmement facile et de signaler que, d'après ces méthodes, les sérums carcinomateux et tuberculeux ont donné un résultat négatif, même lorsqu'ils étaient positifs avec l'antigène de Sachs-Georgi.

La réaction de louchement, inventée par Dold, a été employée par nous dans 510 cas. Sur 262 réactions qui, d'après Wassermann, étaient positives ou faiblement positives, la méthode de Dold a donné 46 résultats négatifs; d'autre part, nous avons trouvé, d'après Dold, 31 cas douteux

ou positifs parmi 248 réactions dans lesquelles la méthode de Wassermann avait été négative. 14,5 % des résultats ne concordent donc pas; en établissant toute la série des réactions de Sachs-Georgi, 16 % des résultats n'étaient plus concordants. Parmi les réactions de contrôle négatives d'après Wassermann, et positives d'après Dold, nous avons constaté trois cas de carcinome (carcinome du rectum, carcinome des amygdales et carcinome du cœur) et un cas de tumeur des amygdales (+). Par conséquent, les antigènes de Dold donnent également une réaction avec les sérums carcinomateux. Il nous a été difficile de constater le louchement; nous avons donc procédé à la lecture après 24 heures. Nous ne pensons pas que les réactions de louchement puissent présenter de grands avantages, en vue de la standardisation de sérodiagnostic, même s'il était possible d'augmenter la spécificité des extraits utilisés.

Considérons les résultats des recherches auxquelles nous nous sommes livrés pendant les deux dernières années: la réaction de précipitation S. G. fournit, dans la plupart des cas, des résultats concordants à ceux de la réaction W. R., à ce point qu'il paraît indiqué de l'introduire dans tous les laboratoires. Pour les cas de cachexie, ainsi que pour les cas à globulines labiles et non spécifiques, les résultats de la réaction S. G. doivent être appréciés avec caution. Les modifications suivantes qui ont été introduites par Dreyer-Ward nous semblent présenter des avantages: *a)* préparation mécanique de la dilution des extraits; *b)* l'appareil d'éclairage, surtout le dernier modèle perfectionné par l'Institut de Copenhague; *c)* l'emploi de l'antigène préparé avec des organes séchés. L'utilisation du bain-marie et l'immersion des tubes jusqu'aux deux tiers de leur longueur ne sont pas essentielles, mais elles permettent, en général, d'obtenir des résultats plus clairs.

Une inactivation d'une heure et demie n'est pas nécessaire. Les zones dans lesquelles aucune précipitation ne se produit sont moins nombreuses, mais les sérums faibles sont encore affaiblis. L'inactivation d'une heure et demie complique les opérations en nous obligeant à employer deux fois la pipette pour le même sérum. Il ne nous paraît pas possible de nous livrer à un calcul exact des unités, étant donné que les divers antigènes n'ont pas la même affinité vis-à-vis des

différents sérums; un calcul exact ne nous paraît pas possible, en pratique. C'est pourquoi nous nous proposons de simplifier le procédé dans les grands laboratoires et de réunir les avantages que chaque méthode présente; à cet effet, la réaction de floculation avec des antigènes à cholestérine devrait, par conséquent, être effectuée dans des tubes Dreyer et au bain-marie, en employant trois tubes avec de l'antigène Sigma (les tubes Nos 2, 3 et 5), un tube avec de l'antigène de Sachs et 0,2 de sérum et, enfin, un cinquième contrôle d'après Sachs et Klopfstock avec de la lécithine. En constituant une série d'après les indications ci-dessus, il suffit d'employer une seule fois la pipette; cette méthode permet également de se rendre rapidement compte des résultats, et combine ainsi les avantages de la méthode primitive avec ceux de la réaction Sigma.

Varsovie, *le* 1er *octobre* 1923.

Tableau I.

Relevé de réactions effectuées d'après les méthodes de Bordet-Wassermann et de Sachs-Georgi pendant la période du 1er janvier au 20 octobre 1923.

Syphilis I.

Wassermann	Traités						Non traités					
	Nombre.	Sachs-Georgi					Nombre	Sachs-Georgi				
		+++	++	+	±	—		+++	++	+	±	—
+++	3	2	1				22	20	1	1		
++							4			3	1	
+							6		2	3		1
±							4			1		3
—							12		1	2	1	8

Syphilis II.

Wassermann	Traités						Non traités					
	Nombre	Sachs-Georgi					Nombre	Sachs-Georgi				
		+++	++	+	±	—		+++	++	+	±	—
+++	34	29	2	2	1		44	36	4	3	1	
++	8	1	4	1	1	1						
+	5			4	1							
±	8		2		1	5	1				1	
—	16					16	1					1

Syphilis III.

Wassermann	Traités						Non traités					
	Nombre	Sachs-Georgi					Nombre	Sachs-Georgi				
		+++	++	+	±	—		+++	++	+	±	—
+++	10	10					9	8		1		
++	2		1	1			2	1	1			
+												
±	1	1										
—	6	1				5						

Syphilis latens.

Wassermann	Traités						Non traités					
	Nombre	Sachs-Georgi					Nombre	Sachs-Georgi				
		+++	++	+	±	—		+++	++	+	±	—
+++	728	593	59	57	7	7	479	409	39	25	5	1
++	210	44	62	82	22		34	11	12	6	5	
+	297	38	36	143	60	20	5	2	1	1	1	
±	283	23	39	84	87	50	4	2	1	1		
—	1164	1	4	24	27	1108	6	1				5

Parasyphilis.

Wassermann	Traités						Non traités					
	Nombre	Sachs-Georgi					Nombre	Sachs-Georgi				
		+++	++	+	±	—		+++	++	+	±	—
+++	6	4		1		1	12	12				
++												
+	3			2	1		1	1				
±	3			2		1						
—	3		1	2			3		1		1	1

Wassermann	Douteux						Sans anamnèse					
	Nombre	Sachs-Georgi					Nombre	Sachs-Georgi				
		+++	++	+	±	—		+++	++	+	±	—
+++	8	6				2	80	63	10	6	1	
++	16		1	6	2	7	14		4	4	4	2
+	37	1	1	13	8	14	32	1	3	15	5	8
±	103	1	3	9	18	42	26		1	9	9	7
—	187	4	12	64	44	63	173	1	5	21	5	141

Wassermann	Non syphilitiques						Somme					
	Nombre	Sachs-Georgi					Nombre	Sachs-Georgi				
		+++	++	+	±	−		+++	++	+	±	−
+++							1434	1196	116	96	15	11
++	2		1	1			291	57	84	103	36	11
+	6			3	2	1	392	43	43	182	78	46
±	8			1	3	4	441	27	46	106	149	113
−	1338	2	1	7	4	1324	2909	9	25	122	82	2671
Somme							5467					

Note. Sur 5.467 cas, les résultats de 419 (7,6 %) n'ont pas été concordants.

Sur 2.258 cas positifs ou douteux d'après Wassermann, 181 = 7 % ont été négatifs selon la méthode de Sachs-Georgi.

Sur 2.909 cas négatifs d'après Wassermann, 238 = 8,2 % ont été positifs selon la méthode de Sachs-Georgi.

Réactions de contrôle positives d'après Wassermann:

++ 2 nourrices.
+ 1 personne saine, 1 personne atteinte de chancre mou, 2 nourrices, 2 cas de blennorrhagie.
± 1 personne saine, 1 personne atteinte de chancre mou, 1 cas de morbus Werlhofü, 1 Polyarthritis, 2 nourrices, 2 cas de blennorrhagie.

Réactions de contrôle positives d'après la méthode Sachs-Georgi:

+++ 1 cas de septicémie, 1 personne saine (?).
++ 2 nourrices.
+ 2 cas de néphrite, 1 cas de chancre mou, 1 cas d'angine de la poitrine, 3 nourrices, 5 cas de blennorrhagie.
± 8 nourrices, 1 cas de blennorrhagie.

Il n'a pas été tenu compte des cas de carcinome et de tuberculose (Voir tableau N° II.)

Tableau II.

Relevé des cas de carcinome.

Wassermann	Nombre	Sachs-Georgi				
		+++	++	+	±	—
+++	1			1		
++						
+						
±						
—	15	7	1	2		5

Note. Sur 15 cas négatifs de carcinome, 5 ont donné un résultat douteux d'après la méthode de Dreyer ($1^1/_2$ à 4 unités); aucun cas n'a été positif.

Relevé des cas de tuberculose.

Wassermann	Nombre	Sachs-Georgi				
		+++	++	+	±	—
+++	2	1	1			
++	1		1			
+	1	1				
±						
—	43	15	4	5	2	17

Note. Parmi les cas qui, d'après Wassermann, ont donné un résultat négatif, 33 ont jusqu'ici été examinés selon la méthode de Dreyer-Ward; 5 d'entre eux ont été douteux, les autres négatifs. Parmi les cas douteux, examinés d'après la réaction de S.-G., un cas a été négatif, un cas +, un cas ++, 2 cas ont été +++.

Tableau III.

Relevé des réactions effectuées d'après les méthodes: Bordet-Wassermann, Sachs-Georgi et Dreyer-Ward.

	Bordet-Wasserm.			Sachs-Georgi			Dreyer-Ward			Total
	Posit.	?	Négat.	Posit.	?	Négat.	Plus de 4 unités	1 1/2 à 4 unités	Moins de 1 1/2 unité	o/o
Syphilis I	16	2	9	14	3	10	16	5	6	25
Syphilis II	25	1	1	24	1	2	24	2	1	27
Syphilis III	8		1	8		1	7	1	1	9
Syphilis latente . . .	84	4	7	85	3	7	81	11	3	95
Parasyphilis	9		3	10	1	1	9	1	2	12
Total des cas de syphilis n'ayant pas suivi un traitement médical .	142	7	19	141	8	19	137	18	13	168
Syphilis apr. un traitem.	138	46	168	141	60	151	128	95	129	352
Total des cas de syphilis	280	53	187	282	68	170	265	113	142	520
douteux	29	35	58	42	33	47	22	49	52	122
Réactions de contrôle .	4	6	313	7	9	307	6	46	271	323

Note Le présent tableau ne comprend pas les cas de tuberculose et de carcinome. Les réactions de contrôle ont été effectuées avec du sang de nourrices, de malades non syphilitiques et de personnes saines.

Tableau III *a*.

Parmi 39 nourrices saines, qui ont été examinées, les résultats suivants ont été obtenus: 16 cas négatifs (résultats concordants) et:

Wassermann	Sachs-Georgi	Dreyer	Nombre
++	++	—	1
++	+	—	1
—	+	—	1
—	±	1,8	1
—	+	1,7	1
—	—	1 1/2–2	9
—	—	2–3	6
—	—	3–4	1
—	—	en sus de 4	2

Tableau IV.

Relevé des résultats non concordants obtenus par les Méthodes Bordet-Wassermann et Dreyer-Ward.

	Wassermann—		Wassermann +		Wassermann ±	
	Dreyer ±	Dreyer +	Dreyer —	Dreyer ±	Dreyer —	Dreyer +
Syphis I . . .	1					
Syphilis II. . .				2		
Syphilis III . .				1		
Parasyphilis . .	1					
Syphilis latente .	4			3		
Syphilis après un traitement . . .	39	8	2	16	6	
Cas douteux . .	8	1	1	8	2	
Réactions de contrôle.	43	6	4		3	

Note. Parmi les malades ayant suivi un traitement pour cause de syphilis, la réaction Wassermann a donné 6 résultats négatifs, tandis que la méthode de Dreyer a été positive en donnant le nombre suivant d'unités Sigma: 2 cas 4,6; 2 cas 5,3; 1 cas 6,6;; 1 cas 7,4.

Parmi les réactions de contrôle, 6 cas qui, d'après Wassermann, étaient négatifs, ont donné le nombre suivant d'unités Sigma : 2 cas 4,7; 2 cas 5,5; 1 cas 9,4; 1 cas 11.

Parmi 43 personnes pour lesquelles la réaction Wassermann a donné un résultat négatif, tandis que celui obtenu par la méthode de Dreyer etait douteux, il se trouvait 17 nourrices. Sur 6 cas négatifs d'après Wassermann et positifs selon Dreyer, il y avait 2 nourrices. Nombre d'unités Sigma: 4,7 et 11.

Parmi les cas négatifs d'après Wassermann et douteux selon Dreyer, la méthode de Sachs-Georgi a donné les résultats positifs suivants: 1 cas de septicémie + + + ; 1 cas de coxite + + + ; 1 cas de myocardite + + ; 1 cas de néphrite + ; 1 cas d'hémophilie + ; 1 nourrice ± ; 1 nourrice +.

Tous les cas, qui étaient négatifs d'après Wassermann et positifs selon Dreyer, ont donné des résultats négatifs par la méthode Sachs-Georgi.

Nous avons considéré comme cas douteux, d'après la méthode Dreyer-Ward, les cas qui n'ont pas donné 1,5 *à* 4 *unités Sigma.*

Tableau V.

Relevé des résultats non concordants d'après les méthodes Sachs-Georgi et Dreyer-Ward.

	Sachs-Georgi + Dreyer +	Sachs-Georgi + Dreyer ±	Sachs-Georgi + Dreyer —	Sachs-Georgi ± Dreyer —	Sachs-Georgi ± Dreyer +	Sachs-Georgi ± Dreyer —
Syphilis I . . .		2				
Syphilis II. . .		1				
Syphilis III . .				1		
Parasyphilis . .			1			
Syphilis latente .		4		4		
Syphilis après un traitement . .	8	22	3	20	2	5
Cas douteux . .	2	15	4	22	3	18
Réactions de contrôle.	6	31		7		1

Note. Parmi les cas de contrôle négatifs d'après Sachs-Georgi et positifs selon Dreyer-Ward, il y avait 2 nourrices. Nombre d'unités Sigma: 2 cas 4,7; 2 cas 5,5; 1 cas 9,4: 1 cas 11.

Résultats de la réaction de Dold comparés a ceux des réactions de Sachs-Georgi et de Bordet-Wassermann.

		Dold					Sachs-Georgi				
Wassermann		+++	++	+	±	—	+++	++	+	±	—
+++	137	95	20	14	2	6	97	16	16	5	1
++	38	8	2	25		3	5	6	12	7	8
+	36	4	1	18	3	10	1	1	13	13	8
±	51	2	4	13	5	27	3	6	7	7	25
—	248	3	3	21	4	217	4	6	15	15	212
R	510										

Sur 214 cas positifs d'après Wassermann, 19 ont été négatifs selon Dold:

10 cas syphilis latente après un traitement.
1 » syphilis I non traitée.
5 » douteux.

1 cas nourrice.
1 » otite moyenne purulente.
1 » ulcère de la jambe.

Sur 51 cas ± d'après Wassermann, 27 étaient négatifs selon Dold:

13 cas syphilis latente après un traitement.
2 » » II » » »
1 » chancre du pénis.
7 » douteux.
1 » surdité.
3 » prostituées n'ayant subi aucun traitement.

Sur 248 cas négatifs d'après Wassermann, 27 ont été positifs selon Dold:

1 cas carcinome du rectum.
1 » » des amygdales.
1 » » cardiae.
11 » syphilis latente après un traitement.
5 » prostituées n'ayant suivi aucun traitement.
3 » douteux.
1 » tuméfaction des amygdales.
1 » avortement.
1 » alcoolisme.
1 » chancre mixte.
1 » chancre induré.

Sur 248 cas négatifs d'après Wassermann, 4 ont été ± selon Dold:

4 cas syphilis latente après un traitement.

Résultats de la réaction de Wassermann comparés a ceux des réactions de Meinicke et de Sachs-Georgi.

		Meinicke sans baume					Sachs-Georgi				
Wassermann		+++	++	+	±	−	+++	++	+	±	−
+++	352	338	6	5	2	1	318	12	1	1	9
++	24	5	6	4	5	4	2	2	7	7	5
+	26		2	1	7	16		1	2	2	15
±	68	1	4	13	31	19		3	5	5	31
—	540			1		539	1	3	6	6	528
R	1010										

Sur 12 cas positifs selon Wassermann et Sachs-Georgi, la réaction de Meinicke a été négative:

11 cas syphilis latente après un traitement.
1 » » II.

Sur 28 cas positifs d'après Wassermann et Meinicke, la réaction de Sachs-Georgi a donné des résultats négatifs:

25 cas syphilis latente après un traitement.
3 » douteux.

Sur 30 cas positifs d'après Wassermann, les réactions de Meinicke et de Sachs-Georgi ont été négatives:

6 cas syphilis II.
4 » » I.
15 » » latente après un traitement.
3 » douteux.
2 » chancre dur.

Sur 9 cas négatifs d'après Wassermann et Meinicke, la réaction de Sachs-Georgi a donné un résultat positif:

8 cas douteux.
1 » paralysie progressive.
1 » négatif d'après Wassermann et positif selon Meinicke et Sachs-Georgi (syphilis du larynx).

Résultats de la réaction de Meinicke (avec baume) comparés a ceux de la réaction de Wassermann.

		Meinicke avec baume					Sachs-Georgi				
Wassermann		+++	++	+	±	—	+++	++	+	±	—
+++	312	247	21	26	9	9	245	35	20	7	5
++	66	25	4	19	6	12	11	11	26	10	8
+	76	29	8	15	8	16	7	8	26	21	14
±	95	17	10	22	13	33	10	18	18	26	23
—	548	41	15	34	22	386	15	23	69	26	415
R	1097										

Sur 454 cas positifs d'après Wassermann, 37 étaient négatifs selon Meinicke, dont:

16 cas syphilis latente non traitée.
3 » douteux.
3 » paralysie.
10 » syphilis latente après un traitement.
1 » avortement.
2 » nourrices.
1 » en observation pour syphilis.
1 » paresthésie.

Sur 95 cas qui, d'après Wassermann, étaient ±, la réaction de Meinicke a donné 33 résultats négatifs:

5 cas prostituées, contrôle.
14 » syphilis latente après un traitement.
1 » syphilis latente non traitée.
7 » douteux.
2 » tuberculose pulmonaire.
1 » nourrice.
1 » alcoolisme.
2 » surdité.

Sur 518 cas négatifs d'après Wassermann, la réaction de Meinicke a donné 90 résultats positifs:

30 cas douteux.
7 » prostituées non traités.
36 » syphilis latente après un traitement.
2 » » » non traitée.
2 » avortement.
2 » chancre dur.
1 » chancre mixte.
1 » symptômes chez l'enfant (mère).
1 » conjoint atteint de syphilis.
1 » nourrice.
1 » artériosclérose, parésie.
1 » rhinite.
1 » perforation septique.
1 » contusion cérébrale.
1 » polypes du nez.
1 » purpura.
1 » symptômes de paralysie.

Sur 548 cas négatifs d'après Wassermann, 22 ont été ± selon Meinicke:

4 cas douteux.
1 » syphilis II après un traitement.
13 » syphilis latente.
1 » psychose pendant l'allaitement.
1 » angine suspecte.
2 » symptômes de paralysie.

Résultats de la réaction de Meinicke, comparés a ceux de la réaction de Sachs-Georgi.

		Meinicke				
Sachs-Georgi		+++	++	+	±	−
+++	282	225	16	20	3	18
++	87	35	9	19	9	15
+	165	41	10	36	19	59
±	81	19	8	13	11	30
−	482	37	11	28	12	390
R	1097					

Sur 534 cas positifs d'après Sachs-Georgi, 92 ont été négatifs selon Meinicke:

6 cas carcinome.
5 » tuberculose pulmonaire.
1 » rhinite atrophique.
1 » gale.
21 » syphilis latente après un traitement.
1 » septicémie.
1 » myocardite.
7 » nourrice.

2 cas en observation.
1 » hémophilie.
1 » hémiplégie.
36 » douteux.
1 » démence.
1 » maladie de cœur.
1 » alcoolisme.
1 » ethmoïde purulente chronique.
1 » infiltration dura nasi.
1 » ictère catarrhal.
1 » furonculose.
1 » ecchymose du fond de l'œil.
1 » endocardite.

Sur 482 cas négatifs d'après Sachs-Georgi, 76 ont été positifs selon Meinicke:

1 cas nourrice.
1 » syphilis II non traitée.
2 » avortement.
1 » polypes du nez.
1 » contusion cérébrale.
1 » artériosclérose.
1 » perforation septique du nez.
2 » chancre induré.
46 » syphilis latente après un traitement.
1 » ulcère de la jambe.
1 » syphilis cérébro-spinale.
3 » syphilis latente non traitée.
11 » douteux.
2 » prostituées n'ayant suivi aucun traitement, saines.
1 » syphilis I non traitée.
1 » tuméfaction du foie, purpura.

Résultats de la réaction de Dold comparés a ceux de la réaction de Sachs-Georgi.

		Dold				
Sachs-Georgi		+++	++	+	±	—
+++	111	88	10	8		5
++	35	12	7	7	12	4
+	65	7	4	25	4	25
±	47	8	6	24	3	12
—	232	1	2	19	7	203
R	510					

Sur 211 cas positifs d'après Sachs-Georgi, 34 ont été négatifs selon Dold:

19 cas syphilis latente après un traitement.
8 » douteux.
2 » syphilis II après un traitement.
2 » nourrices.

1 cas otite moyenne purulente.
1 » maladie du cœur.
1 » abcès de l'amygdale, pharyngite.

Sur 47 cas ± d'après Sachs-Georgi, 12 ont été négatifs selon Dold:

3 cas nourrices.
3 » prostituées n'ayant suivi aucun traitement.
2 » syphilis latente après un traitement.
3 » douteux.
1 » angine syphilitique.

Sur 232 cas négatifs d'après S.-G., 22 ont été positifs selon Dold:

12 cas syphilis latente après un traitement.
1 » chancre induré.
1 » syphilis II après un traitement.
2 » douteux.
1 » tuméfaction des amygdales.
1 » alcoolisme.
1 » avortement.
3 » prostituées saines, n'ayant suivi aucun traitement.

Sur 232 cas négatifs d'après S.-G., 3 ont été douteux selon Dold:

3 cas syphilis latente après un traitement.

3.

COMPARATIVE INVESTIGATION INTO THE SERO-DIAGNOSIS OF SYPHILIS BY THE B.W., S. G., Σ, D.M. and M.T.R. TESTS. EXPERIMENTS CARRIED OUT BY J. R. MOERCH.

Report by Dr. Th. Madsen.

Since the report presented at the Paris Conference 1922, the comparative investigation into the sero-diagnosis of syphilis has been continued. Furthermore, the experiments have been extended to include the new M.T.R. with two extracts (extr. 12 and extr. 16) and the B. W. with extract of syphilitic liver.

229 cerebro-spinal fluids, 549 sera of treated and untreated cases of syphilis, and 917 control cases were examined. The controls were specially selected with a view to the inclusion of conditions on which occasionally, unspecific reactions are reported (pregnancy, tuberculosis, scarlet fever, etc.).

Table 1 shows the results of the examinations of the *cerebro-spinal fluid.* It will be observed that the Σ test has given the highest number of positive reactions in syphilis without unspecific results, and that the B. W. compared favourably in contradistinction to S. G. and especially D. M.

The S. G. test, moreover, gave a positive reaction in a case of tuberculosis miliaris (tubercle bacilli in the cerebro-spinal fluid).

M.T.R. was not carried out with cerebro-spinal fluids, as their content of albumen is too small to prevent clouding and flocculation of the extracts, so that all cerebro-spinal fluids give apparently positive reactions. (The addition of 0.2 cc. horse serum or normal human serum may possibly render this test applicable to cerebro-spinal fluid.)

Table 2 gives the results of the examination of *syphilitic sera.* The percentage of positive results are:

M. T. R. (E. 16)	76.7 %
Σ	72.7 %
S. G.	70.3 %

B. W. with syphilitic liver extract .	68.8 %
M. T. R. (E. 12)	67.4 %
B. W. with human heart extract . .	64.3 %
D. M.	61.4 %

In this series both S. G. and D. M. gave much better results than those mentioned in the report to the Paris Conference 1922.

Tables 3 and 4 show the results of the *control cases*. It must be emphasised that the sera in cases of pregnancy were all obtained from public maternity hospitals and that therefore syphilis could not be excluded even in the absence of history or clinical symptoms.

B. W. carried out with syphilitic liver extract gave a great number of unspecific results especially in pregnancy, tuberculosis and scarlet fever.

M. T. R. (extr. 16) gave about the same number of unspecific results especially in gonorrhœa.

S. G. gave comparatively many unspecific results, 23 out of 362 in cases of pregnancy. Out of these 23, 13 occurred with the use of one and the same extract. This was used for one month only. The pregnancy cases were examined both immediately before and immediately after delivery At the second examination the reaction was usually weaker or negative.

B. W. with human heart extract, D. M. and M. T. with extract 12, showed about the same specificity. The Σ reaction gave the smallest number of positive control cases, which were all examined two or three times.

Table 4 shows the results of examination of the *control cases* by the various tests. In the cases where more than four of the different reactions gave positive results, it seems justifiable to conclude that syphilis is present.

In the left-hand column of the following table, the percentage of positive reactions is shown in those control cases where there was no history or clinical evidence of syphilis. In the right-hand column, the percentage is shown which is obtained when those cases have been deducted, in which the results with four reactions were positive, and which were therefore possibly syphilitic.

	%	%
B. W. with syphilitic liver extract . . .	5.8	4.5
M. T. R. with extract 16	4.9	3.6
S. G. R.	4.2	3.0
B. W. with human heart extract . . .	2.0	1.2
M. T. R. with extract 12	1.9	0.6
D. M. R.	1.6	0.9
Sigma	0.8	0.0

Technical Remarks by J. R. Moerch.

B. W. was carried out according to the technique indicated by *Oluf Thomsen* and developed by *Boas and Thomsen* (*Thomsen:* Zeitschr. für Immunitätsforschung und experimentelle Therapie Bd. 7; *Boas:* Die Wassermann'sche Reaktion, 1922). Conformably with the suggestion of Dr. *Boas*, syphilitic liver extract was also employed.

Σ. The use of a graduated pipette was found more convenient than the drop method of *Dreyer-Ward*. A special series of experiments demonstrated that the final result was the same. The serum was measured in doses of 0.4, 0.2, 0.1, 0.05 and 0.02 cc. 0.1 cc.; α suspension was added with a pipette to tube 1; 0.3 β suspension with a special mechanical syringe to the remaining tubes. This procedure saves time and serum as the total volume is smaller than in the dropping method. The tables for the calculation of the Σ units per cc. were recalculated for the changed dilutions. The reading was taken only at 22 hours.

D. M. and S. G. were carried out strictly according to the author's directions.

For S. G., Σ, D. M., M. T. R., the original extracts of the authors were used. Syphilitic liver extract was obtained from the Apotheke Fresenius, Frankfurt-on-the-Main.

Some of the extracts kindly sent by Professor *Sachs* showed a tendency to spontaneous flocculation, which could be avoided by decreasing the interval between the first and the second dilution from 30 to 15 seconds. Unspecific reactions were observed with all extracts; one particular extract gave an especially large number of unspecific results without showing any enhanced sensitiveness in known cases of syphilis.

Some of the sera giving unspecific reactions were simultaneously examined by the S. G. technique but with a Σ extract suspension. In such cases positive results were only obtained with original S. G. extracts. Evidently fundamental differences existed between the two extracts.

The following general conclusions can be drawn:

(1) M. T. R. with extr. 16 is a very sensitive test, but not quite specific. M.T.R. with extr. 12 is both specific and sensitive. The reading is easy and convenient for trained observers. The result is obtained in one hour. A drawback of this test is that, as it is impossible to titrate the extract (the evaluation of which depends on the opacity of its dilution), quantitative results thus cannot be obtained.

(2) The Σ reaction combines the greatest sensitiveness with the highest degree of specificity. It is an advantage that the extracts can be exactly titrated, but it would perhaps be desirable that each consignment of extract should be accompanied by some of the identical cholesterin which has been used in the estimation of the suspension factor, since investigations have shown that different samples may vary. The Σ method gives in the hand of the same investigator very constant quantitative figures, when it is desired to follow the course of the reaction during treatment.

(3) S. G. gave about the same number of positive reactions as Σ in cases of syphilis, but at the same time some unspecific results, especially in cases of pregnancy and tuberculosis. The rather large quantity of water present in the tissue during the preparation of the S. G. extracts renders them less stable than the Σ extract. The sensitiveness of the S. G. extracts is rather variable.

(4) The B. W. reaction with human heart extract has given good results in our hands, but has proved not to be very sensitive. The test with syphilitic liver extract is more sensitive, but has given numerous unspecific results.

(5) D. M. has proved to be less sensitive than all other methods.

If it is desired to use the Σ method for a large number of tests, it could be combined with the M. T. R. in the following way: all sera are first tested by the M. T. R. Those reacting positively are then tested by Σ in 7 tubes (1-7) (when a quantitative titration is desired). Sera which give a negative reaction with M.T.R. are also examined with Σ but only with one tube, viz. tube No. 2 (10 drops of serum).

If only a qualitative examination be desired, it is sufficient to test the sera which have reacted positively with M. T. R. by the Σ reaction using only tube 2 (10 drops) and tube 5 (1 drop)[1]. It must, however, be emphasised that, by this procedure, weak positives, reacting only in tube No. 1, are lost; such weak positives are of value for diagnosis, especially if they are supported by a positive M. T. R.

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[1] An examination of 2,500 sera, 699 of which gave positive reactions, has shown that 319 were positive in tubes 2 and 5, 369 in tube 2 alone, and only 11 in tube 5 alone. Thus in no case would a positive reaction have been lost, if the test had been carried out with these two tubes only. The limit between positive and negative was here defined by "trace" in tube 2 corresponding to 1.5 Σ units. Sera giving a negative reaction with M.T.R. should in the Σ only be examined with tube No. 2. As shown in Table 5, the M. T. R. results practically include all cases which were positive even with only one of the four reactions in the 355 cases reported on the table.

It is not advisable to rely on the M.T.R. alone in its present form, as the test sometimes fails with weak positive sera and on the other hand may yield unspecific reactions in cases of gonorrhœa and pregnancy.

With the exception of the pipetting of sera and sodium chloride solution for *quantitative* performance of the Σ test the delivery into the tubes of both serum and extracts for both reactions can be made with a mechanical syringe to which reference has been made above. The time necessary for the examination of 100 sera, of which about 20 are positive (including quantitative titration), is as follows:

Pipetting of serum and extract for the M.T.R.	50 minutes
Reading of M.T.R.	10 „
	60 minutes
Pipetting for Σ test of 20 positive sera (7 tubes each) and 80 negative sera (1 tube each)	1 h. 45 minutes
Preparation of the extract-suspension	15 „
Delivery into tubes of the extract suspension	15 „
Shaking of the tubes	30 „
Reading of 20 positive and 80 negative reactions	1 h.
	4 h. 45 minutes

Table 1.

Liquor Cerebro-Spinalis.

	No.	B. W. +	S. G. +	Sig-ma +	D. M. +	Obs.
S. I	1	0	0	0	0	
S. II	3	0	0	1*	0	* Neurit. acut.
S. III	1	0	0	0	0	
S. treated	26	0	0	0	0	
S. latent	63	0	0	0	0	
Tabes dors.	11	8	4	11	2	
Dem. par.	24	23	16	24	9	
S. Cerebrospin.	9	6	5	9	4	
S. total	138	37	25	45	15	
Controls	91	0	1*	0	0	*Tb. miliar. + Tbc.

Table 2.

Serum-Syphilis.

		No	B. W. ^{1} +	B. W. ^{2} +	S.G. +	Sig-ma +	D. M. +	M.T. $_{12}$ +	M. T. $_{16}$ +
S. I	untreated	15	12	12	12	13	12	11	11
S. II	,,	65	64	65	65	65	63	64	65
S. III	,,	2	2	2	2	2	2	2	2
S. congen.	,,	7	3	2	7	7	3	3	4
Dem. par.	,,	11	11	11	10	11	9	11	11
Tabes dors.	,,	1	0	1	0	1	0	1	1
S. treated		279	205	210	217	227	186	207	239
S. latent		169	56	75	73	73	62	71	88
S. total		549	353	378	386	399	337	370	421

Table 3.

Serum Controls.

	N°	B.W.[1] +	B.W.[2] +	S. G. +	Sigma +	D. M. +	M. T. 12 +	M. T. 16 +
Graviditas	362	10	17	23	4	7	9	12
Tuberculos.	236	5	25	9	3	5	6	11
Go. & Ulc. ven.	191	1	2	1	0	1	2	18
Diphtheria	40	0	1	2	0	1	1	2
Typhus & Parat.	38	0	1	0	0	0	0	1
Scarlet fever	37	3	7	2	0	0	0	0
Influenza	7	0	0	0	0	0	0	0
Erysipelas	6	0	0	2	0	1	0	0
Total	917	19	53	39	7	15	18	45

In tables 2 and 3:
B. W.[1] = with extract of human heart
B. W.[2] = „ „ syphilitic liver.

Table 4.

D.M., S.G., B.W. hum. heart	+ + +	− + +	− + −	+ − −	− − +	+ + −	− − −
Sigma + M.T.R. E 12 + „ E 16 + B.W. S.L. +	6	0	1				
Sigma − M.T.R. E 12 + „ E 16 + B.W. S.L. +	0	2	2	1			1
Sigma − M.T.R. E 12 + „ E 16 + B.W. S.L. −	0	2	2	1	0	0	2
Sigma − M.T.R. E 12 − „ E 16 + B.W. S.L. +	0	0	1	0	1	1	3
Sigma − M.T.R. E 12 − „ E 16 + B.W. S.L. −	0	0	0	0	0	2	19
Sigma − M.T.R. E 12 − „ E 16 − B.W. S.L. +	0	4	2	0	4	1	25
Sigma − M.T.R. E 12 − „ E 16 − B.W. S.L. −	0	0	12	1	0	2	819

The explanation of the construction of this table is as follows: The reactions with D.M., S.G., B.W.-human heart are represented on the top horizontal line by seven groups of hieroglyphics respectively

namely: + + +, — + +, — + —, + — —, — — +, + + —, — — —. The reaction with Sigma, M.T.R. E 12, M.T.R. E 16 and B.W. S.L. are similarly represented in the left-hand vertical column. Thus, — + — signifies that D.M. was negative whilst S.G. was positive and B.W. human heart was negative.

If, for example, it is desired to ascertain how many control sera reacted positively with M.T.R. E 16 and also with D.M. and S.G. and negatively with the rest, this is found by reference to the figure where the fifth horizontal space intersects the sixth vertical column, the number being 2.

Table 5.

M. T. R. E. 12, M. T. R. E. 16	+ +	+ —	— +	— —
B.W. + Sigma +	260		12	9
B.W. — Sigma +	23	1	11	1
B.W. — Sigma —	9	1	22	
B.W. + Sigma —	1	1	2	2

This table, concerning the results with B.W. (human heart), Sigma and M.T.R. E. 12 and 15 in 355 cases of syphilis is to be used in the same way as Table 4, showing that only two cases (fourth horizontal space, fourth vertical column), do not react with the M.T.R. whilst they are positive with B.W.

4.

VERGLEICHENDE UNTERSUCHUNGEN ZUR LUESDIAGNOSE MIT BORDET-WASSERMANN-, SIGMA-, MEINICKE D.M.- UND SACHS-GEORGI-REAKTION.

Von R. Müller.

I.

Von der Pariser Konferenz im November 1922 bis zum Oktober 1923 wurden 1010 geeignete Fälle vergleichend serologisch untersucht und zwar wurde in jedem Fall die WaR.-, Sigma-Reaktion, die D.M.- und die Sachs-Georgi-Reaktion angestellt. Die Technik blieb im allgemeinen die gleiche, wie sie in dem Bericht für die Pariser Konferenz geschildert wurde, unter Berücksichtigung der auf letzterer für die Flockungsreaktionen festgestzten Normen. Doch seien im Folgenden noch einige Punkte erwähnt, die, wie wir glauben, für die Schlussfolgerungen aus den Resultaten von Wichtigkeit sind.

1. *Wassermann-Reaktion.* — Für den wichtigsten Faktor bei unserer Ausführungsart der WaR. sehen wir die besondere Bereitungsweise des Antigens an. Es handelt sich nicht nur um das quantitative Verhältnis zwischen Lipoid und Cholesterin einerseits, Patientenserum andererseits, sondern ganz besonders um die kolloidale Qualität des Antigens, die von seiner optimalen Einstellung abhängt. Diese günstige Einstellung erzielen wir, wie wir schon in dem Bericht des Vorjahres erwähnten, durch zweizeitige rasche Verdünnung eines cholesterinierten alkoholischen zur Siedehitze gebrachten Rinderherzextraktes und nachfolgende Reifung bei 56 Grad.[1] Mit der auf diese Weise entstandenen *Suspension* erhielten wir

[1] Das Verfahren ist des Näheren in dem Bericht über die Kopenhagener-Konferenz geschildert.

Resultate, die in Bezug auf Empfindlichkeit und Spezifität ganz besonders gut sind. Als zweiter wichtiger Faktor kommt das Komplement in Betracht. Es darf nicht übersehen werden, dass es mitunter Komplemente gibt, die trotz genügender Lösungskraft im hæmolytischen Versuch sich beim Vorversuch mit Normalserum und Antigen als zu empfindlich erweisen. Es wird sich daher immer empfehlen durch einen Vorversuch mit Normalseren solche Komplemente von zu grosser Ablenkbarkeit zu ermitteln und auszuschalten, besonders bei Versuchen an grossem Krankenmaterial. Bei kleineren Versuchen ist es wohl ökonomischer unter Verzicht auf den Vorversuch sich durch genügend viele Normalkontrollen beim Hauptversuch zu sichern und in den seltenen Fällen, wo diese Kontrollen eine zu grosse Deviabilität des Komplements aufdecken, den ganzen Versuch mit einem anderen Komplementgemisch zu wiederholen. Bezüglich der Verwertung der Ergebnisse sei erwähnt, dass wir ganz schwache Ausfälle, die bei Fehlen klinischer Angaben im allgemeinen als zweifelhaft zu bezeichnen wären, dann als positiv angaben, wenn Lues mit Sicherheit feststand, als negativ jedoch, wenn kein Anhaltspunkt dafür vorlag. Bei unserem Material gab es etwa 2-3 % derartiger Ausfälle.

2. *Sigma-Reaktion.* — Die Sigma-Reaktion wurde nach der Originalvorschrift und den Bestimmungen der Pariser Konferenz angestellt, also mit 4 Röhrchen der β Reihe und meistens auch mit Röhrchen 1, d. h. mit α Extrakt. Die Ablesung erfolgte nach ungefähr 24 Stunden.

Dritte Modifikation von Meinicke. — Zu D.M. verwendeten wir wieder wie im Vorjahre selbstbereitete Extrakte und wählten aus mehreren die gut reagierenden aus, da sich die Originalextrakte im allgemeinen als zu schwach erwiesen. Die verwendeten Serummengen waren 0,1, 0,2 und 0,4. Die Anstellung dieser Reihe empfiehlt sich, weil ein auffallendes Ueberwiegen der Flockungsstärke mit den kleineren Serumdosen, wie wir noch später ausführen werden, für uns einen Hinweis auf die Unspezifität der Reaktion bedeutet. Die erste Ablesung erfolgt nach 24 Stunden Brutschrank, in zweifelhaften Fällen eine zweite Ablesung nach weiteren 24 Stunden Zimmeraufenthalt.

Sachs-Georgi. — Wir hielten uns an die Originalvorschrift und benützten meistens den Originalextrakt II, daneben zum Vergleich auch selbstbereitete Extrakte, die nicht nennenswert anders reagierten. Die Serumdosen waren 0,1 und 0,2 mit entsprechender Kochsalzauffüllung. Die Ablesung erfolgte nach 24 Stunden.

Bemerkungen zum verwendeten Patientenmaterial.

Bei der Auswahl der Luesfälle legten wir Gewicht darauf hauptsächlich Sera von solchen Stadien zu bekommen, welche die grössten Differenzen zwischen den einzelnen Reaktionen erwarten liessen, d.i. möglichst frische Sklerosen, dann jüngere Lues, die bereits mehr oder minder stark behandelt war, und latente Lues. Von 596 untersuchten Luesfällen gehörten 496 diesen Gruppen an. Bei den Nichtluesfällen unterschieden wir zwei Gruppen: 1. Gesunde und an leichten Lokalerkrankungen (z.B. Ekzem, Urethritis anterior) Leidende; 2. Schwerkranke und Gravide. Von den Schwerkranken wurden Tuberkulöse und fieberhaft Erkrankte besonders rubriziert. Auch die Aortitisfälle, soweit sie nicht von vorneherein als syphilitisch feststanden, wurden getrennt geführt und ebenso die Augenfälle, die keine Luesanamnese aufwiesen, bei denen aber nach klinischer Auffassung Lues als eventuelle Aetiologie in Betracht kam. Von dem Aortitisfällen erwies sich tatsächlich ein relativ hoher Perzentsatz als syphilitisch bedingt, hingegen bestätigte sich betreffs der Augenfälle unsere frühere Erfahrung, dass die meisten Fälle von Iritis, Chorioditis, etc., die nur mangels einer anderen bekannten Ursache auf Lues zurückgeführt werden, negativ reagierten und wohl auch kaum luetischer Natur sein dürften.

Kommentar zu den Tabellen.

Wir hielten die im Vorjahr gewählte Art der tabellarischen Uebersicht bei und verweisen insbesondere auf die kleinen Tabellen der einzelnen Luesstadien, beziehungsweise Krankheitsgruppen, die zu rascher Orientierung geeignet erscheinen. Diese Tabellen haben den Vorzug nicht nur in linearer Anordnung das perzentuelle Verhältnis zwischen zwei Reak-

tionen anzuzeigen, sondern auch durch flächenhafte Darstellung auszudrücken, wie sich die Resultate in den *einzelnen Fällen* verhalten und dies nicht nur für jeweils zwei Methoden, sondern gleichzeitig für sämtliche vier zu prüfende Reaktionen. Es interessiert uns z.B. nicht nur die Tatsache, dass behandelte Lues in 80,7 % nach Wassermann und 75,1 % nach Sigma positiv reagiert, sondern es erscheint auch von Bedeutung, dass trotz dieser allgemeinen Ueberlegenheit der WaR. über Sigma letztere in 6 von 332 Fällen positiv war, in denen die WaR. versagte, und namentlich ist es wichtig, wie sich in solchen Fällen die anderen Flockungsreaktionen verhalten. Diese wechselseitigen Beziehungen sind, wie wir glauben, aus den Tabellen rasch ablesbar. Unter jeder der kleinen Tabellen ist noch in Perzenten berechnet, wie gross die Zahl der positiven Ausfälle bei jeder der einzelnen Methoden ist. Schliesslich wurde noch die Zahl der positiven Ausfälle der einzelnen Flockungsreaktionen zur Zahl der positiven Ausfälle nach Wassermann in Beziehung gesetzt, wobei letztere immer als 100 angenommen wurde.

Zusammenstellung der eigenen Paralleluntersuchungen
(1010 Fälle.)

Syphilis prim.

I. S.G.	+	+	—	—
Sigma	+	—	—	+
Wa. + M. +	6			1
Wa. + M. —	2			2
Wa. — M. —				
Wa. — M. +			1	1

Zahl der Fälle, 16.

Frische Lues secundaria.

II. S.G.	+	+	—	—
Sigma	+	—	—	+
Wa. + M. +	26			
Wa. + M. —				
Wa. — M. —				
Wa. — M. +				

Zahl der Fälle, 26.

Positiv nach allen Reaktionen.

Nach Wa.	pos.	14 = 87,5 %
» Sigma	»	12 = 75 %
» M.	»	12 = 75 %
» S.G.	»	8 = 50 %

Wa.	Sigma	M.	S.G.
100	85	85	57

Lues III.

III. S.G. / Sigma	+ / +	+ / −	− / −	− / +
Wa. + M. +	4			
Wa. + M. −				1
Wa. − M. −			3°	
Wa. − M. +				

Zahl der Fälle, 8.

Nach Wa.	pos.	5 = 62,5 %
» Sigma	»	5 = 62,5 %
» M.	»	4 = 50 %
» S.G.	»	4 = 50 %

Wa.	Sigma	M.	S.G.
100	100	80	80

° = vor kürzerer Zeit behandelte Fälle.

Lues latens.

IV. S.G. / Sigma	+ / +	+ / −	− / −	− / +
Wa. + M. +	48		10^{2}	16
Wa. + M. −	4		4	8
Wa. − M. −			48	10^{2}
Wa. − M. +				

Zahl der Fälle, 148

Nach Wa.	pos.	90 = 60,8 %
» Sigma	»	86 = 58,1 %
» M.	»	74 = 50,0 %
» S.G.	»	52 = 35,1 %

Wa.	Sigma	M.	S.G.
100	95,5	77,7	57,7

Hochgestellte ^{1,2} etc. bedeutet, dass 1, 2 etc. Fälle von der Gesamtzahl dieser Rubrik nur ganz schwache Reaktionen zeigten.

Syphilis in Behandlung.

V. S.G. / Sigma	+ / +	+ / −	− / −	− / −
Wa. + M. +	160		8	48^{2}
Wa. + M. −	2	6	18^{2}	18^{6}
Wa. − M. −			48	6
Wa. − M. +	6			2

Zahl der Fälle, 332.

Nach Wa.	pos.	260 = 80,7 %
» Sigma	»	242 = 75,1 %
» M.	»	224 = 69,5 %
» S.G.	»	174 = 54,0 %

Wa.	Sigma	M.	S.G.
100	93,0	96,1	66,9

Metalues.

VI. S.G. / Sigma	+ / +	+ / −	− / −	− / +
Wa. + M. +	20	4^{2}	2	6
Wa. + M. −	2^{2}	6	2^{2}	2
Wa. − M. −	2		8	
Wa. + M. +				

Zahl der Fälle, 48.

Nach Wa.	pos.	38 = 72,1 %
» Sigma	»	32 = 66,6 %
» M.	»	32 = 66,6 %
» S.G.	»	28 = 58,3 %

Wa.	Sigma	M.	S.G.
100	84,2	84,2	73,6

Lues hereditaria.

VII. S.G. Sigma	+ +	+ —	— —	— +
Wa. + M. +	14			
Wa. + M. —				
Wa. — M. —			4	
Wa. — M. +				

Zahl der Fälle, 18.

Nach Wa. pos.
» Sigma » } 14
» M. »
» S.G. »

Lues insgesamt.

VIII. S.G. Sigma	+ +	+ —	— —	— +
Wa. + M. +	278	4^{2}	20^{2}	74^{2}
Wa. + M. —	10^{2}	6	24^{4}	31^{6}
Wa. — M. —	2		111	6
Wa. — M. +	6		1	3

Zahl der Fälle, 596.

Nach Wa. pos. 447=75 %
» Sigma » 467=69,9 %
» M. » 386=64,7 %
» S.G. » 308=51,6 %

Wa.	Sigma	M.	S.G.
100	93,2	86,3	68,9

Aortitis.

IX. S.G. Sigma	+ +	+ —	— —	— +
Wa. + M. +	8			2
Wa. + M. —				
Wa. — M. —			13	1°
Wa. — M. +				

Zahl der Fälle, 24.

Nach Wa. pos. 10=41,6 %
» Sigma » 11=45,8 %
» M. » 10=41,6 %
» S.G. » 8=33,3 %

Wa.	Sigma	M.	S.G.
100	110	100	80

° = mit Luesanamnese.

Augenerkrankungen.

X. S.G. Sigma	+ +	+ —	— —	— +
Wa. + M. +	2		1	
Wa. + M. —				
Wa. — M. —		1	56	1
Wa. — M. +	1			

Zahl der Fälle, 62.

Nach Wa. pos. 3=4,8 %
» Sigma » 4=6,4 %
» M. » 4=6,4 %
» S.G. » 4=6,4 %

Wa.	Sigma	M.	S.G.
75	100	100	100

Gravidität.

XI. S.G. Sigma	+ +	+ —	— —	— +
Wa. + M. +				
Wa. + M. —				
Wa. — M. —	8[2]		16	2
Wa. — M. +				

Zahl der Fälle, 26.

Nach Wa. pos. —
» Sigma » 10 = 38,4 %
» M. » —
» S.G. » 8 = 30,7 %

Tbc. u. fieberhafte Erkrankungen.

XII. S.G. Sigma	+ +	+ +	— —	— —
Wa. + M. +				
Wa. + M. —			1	
Wa. — M. —	2	2	15	
Wa. — M. +	2		2[o]	

Zahl der Fälle, 24.

Nach Wa. pos. 1 = 4,2 %
» Sigma » 4 = 16,8 %
» M. » 4 = 16,8 %
» S.G. » 4 = 16,8 %

Sonstige Krankheitsfälle allgemeiner Natur.

XIII. S.G. Sigma	+ +	+ —	— —	— +
Wa. + M. +	1[o]			
Wa. + M. —				
Wa. — M. —		1[oo]	92	4[ooo]
Wa. — M. +	1[oo]			

Zahl der Fälle, 99.

Unter Abrechnung des Falls von Arthritis deformans

Nach Wa. pos. 1 = 1 % 0 = 0 %
» Sigma » 6 = 6 % 5 = 5 %
» M. » 2 = 2 % 1 = 1 %
» S.G. » 3 = 3 % 2 = 2 %

Gesunde und leichte Lokalerkrankungen.

XIV. S.G. Sigma	+ +	+ —	— —	— +
Wa. + M. +				
Wa. + M. —				
Wa. — M. —			180	3[2]
Wa. — M. +				

Zahl der Fälle, 183.

Nach Sigma pos. 3 = 1,6 %

[o] Arthritis deformans.
[oo] Pleuritis.
[ooo] 1 fragliches Carciniom.
1 Epilepsie.
1 Balanitisfälle.

Allgemeine Uebersicht
ueber
die eigenen Paralleluntersuchungen seit der Pariser Konferenz.

		Zahl der Fälle	WaR.		Σ		D.M.		S. G.	
			pos.	neg.	pos.	neg.	pos.	neg.	pos.	neg.
I.	Lues I.	16	14	2	12	4	12	1	8	8
II.	Lues II. . . .	26	26	—	26		26	—	26	—
III.	Lues III. . . .	8	5	3	5	3	4	4	4	4
IV.	L. lat.	148	90	58	86	62	74	74	52	96
V.	L. in Behandl. .	332	260	72	242	90	224	108	174	158
VI.	Metalues . . .	48	38	10	32	16	32	16	28	20
VII.	L. congenita .	18	14	4	14	4	14	4	14	4
VIII.	L. insgesamt. .	596	447	149	417	179	386	210	308	288
IX.	Aortitis . . .	24	10	14	11	3	10	14	8	16
X.	Augenfälle . .	62	3	59	4	58	4	58	4	58
XI.	Gravidität. . .	26		26	10	16	-	26	8	18
XII.	Tbr. u. Fieber .	26	1	25	4	22	4	22	4	22
XIII.	Sonstige Allgemein-Erkrankungen . . .	99	1	98	6	93	2	97	3	96
XIV.	Gesunde und leichte Lokalerkrangungen	183	—	183	3	180	—	183	—	183

Gesamtzahl 1016
Lues 596
Nichtlues 334
Aortitis u. Augenfälle . . . 86

Ueberblick über die Resultate.

Ueberblicken wir die Resultate, so kommen wir im grossen und ganzen zu ähnlichen Schlüssen, wie sie im Pariser Konferenz-Bericht niedergelegt sind, und wir können uns daher auf eine kurze, resümierende Uebersicht beschränken. Die besten Gesamtresultate ergab wiederum die WaR., bei der vor allem auch die Spezifität am besten gewahrt erscheint. Bei Gesunden, leicht Erkrankten und Graviden war kein positiver Ausfall zu verzeichnen, die Ausfälle bei luessuspecter Aortitis und bei Augenerkrankungen ohne

Luesanamnese sind in Uebereinstimmung mit den Flockungsreaktionen wohl mit Sicherheit als spezifisch aufzufassen. Von Erkrankungen allgemeiner Natur fand sich eine schwach positive Reaktion, aber ebenfalls gemeinsam mit den Flokkungsreaktionen, bei dem Fall von Arthritis deformans, bei dem wohl auch das Vorhandenseins von Lues angenommen werden darf, so dass demnach nur bei einem Fall von Pleuritis positive Reaktion (+) mit WaR. allein (ohne Flockungsreaktionen) sich ergibt, die mit Wahrscheinlichkeit als unspezifisch zu deuten ist. Die WaR. ergab andererseits die meisten positiven Resultate bei Lues. Eine wirkliche Ueberlegenheit kommt naturgemäss nur in den schwächer reagierenden Fällen zum Ausdruck, das sind vor allem die oben erwähnten Gruppen der Lues I, Lues in Kur und Lues latens. Dagegen sind bei Lues II und Lues hereditaria keine Differenzen zwischen WaR. und den Flockungsreaktionen zu konstatieren. Es wird also von der Art des Luesmaterials abhängen, wie bei den einzelnen Untersuchern das perzentuelle Verhältnis der Reaktionen sich gestaltet.

Von den Flockungsreaktionen kam die Sigma-Methodik den mit WaR. erhaltenen Resultaten am nächsten. Insgesamt war sie um nicht ganz 7 % weniger empfindlich als die WaR. Dabei sei hier noch einmal erwähnt, dass trotz dieser durchschnittlichen Unterlegenheit einige Fälle, insbesondere von behandelter Lues, nach Sigma positiv, nach WaR. negativ reagieren. Dagegen erwies sich von allen Flockungsreaktionen die Sigma-Reaktion als die wenigst spezifische. Ein auffallend hoher Perzentsatz von Ausfällen zeigte sich bei vermutlich nicht syphilitischen Graviden. Allerdings kann diese hohe Zahl positiver Ausfälle nicht voll gewertet werden, da uns von den gynäkologischen Kliniken gerade zur Zeit der Untersuchungen zum Teil Retroplacentarblut gesendet wurde, ohne dass wir vorher davon verständigt waren. Gerade solche Proben zeigten nun (auch ausserhalb dieser Untersuchungsreihe) manchmal positive Ausfälle nach Sigma und Sachs-Georgi. Immerhin war auch bei Tuberkulose und anderen Krankheitsfällen, ja sogar bei leichten Lokalerkrankungen manchmal bei der Sigma-Methodik Flockung zu konstatieren, während weder die anderen Flockungsreaktionen noch die WaR. Lues anzeigten.

Die D.M. war bei sicheren Luesfällen um ungefähr 7 % weniger empfindlich als Sigma, erwies sich hingegen als spezifischer. Weder bei Gesunden noch bei Graviden fand sich ein positiver Ausfall. Bei Tuberkulose zeigte sie etwa gleiche Spezifität, wie die Sachs-Georgi-Reaktion und bei anderen Krankheitsfällen war die D.M. in etwa 1 % der Fälle unspezifisch, während die Sigma-Reaktion 5 % unspezifischer Ausfälle aufwies. Reaktionen der D.M., die mit der höheren Serumdose 0,4 auffallend schwächer als mit der niederen 0,1 oder nur mit dieser positiv waren, rechneten wir, wie schon erwähnt, bei fehlender Luesanamnese nicht den positiven Ausfällen zu.

Die *Sachs-Georgi*-Reaktion erwies sich, bei uns ebenso, wie in den Ergebnissen der Pariser Konferenz schon mitgeteilt wurde, auffallend wenig empfindlich. Wir werden darauf in den Schlussbetrachtungen noch zurückkommen. Trotz dieser mangelhaften Empfindlichkeit bei Lues fanden wir, besonders bei vermutlich nichtsyphilitischen Graviden, ebenso wie bei Sigma manchmal Flockungen schwachen bis mittleren Grades. Bei Tuberkulose und anderen Erkrankungen war die Spezifität ungefähr die gleiche, wie die der D.M. Ebenso wie hier fanden sich bei Gesunden und an leichten Lokalerkrankungen Leidenden keine unspezifischen Resultate.

Schlussbetrachtungen.

Das Ergebnis unserer Untersuchungen deckt sich vollkommen mit dem anlässlich der Pariser Konferenz gegebenen Bericht, wir müssten so ziemlich wörtlich das dort Gesagte wiederholen. Die besten Resultate lieferte uns auch an dem Material dieses Jahres wiederum die WaR. sowohl hinsichtlich der Empfindlichkeit bei Lues, als auch hinsichtlich der Spezifität bei Nichtlues. Besonderes Augenmerk bei der WaR., man mag was immer für Methode verwenden, verdient das Antigen und auch eine genaue Prüfung des Komplements an entsprechenden Kontrollen wird immer notwendig sein.

Auch bezüglich des Verhältnisses der drei geprüften Flockungsmethoden zueinander und zur WaR. konnte unser Urteil in prinzipiellen Punkten sich nicht ändern. Nur war die Spezifität namentlich der Sigma-Reaktion diesmal etwas

geringer. Hauptsächlich Sera nichtsyphilitischer Gravider beziehungsweise Wöchnerinnen zeigten bei der Sigma-Methodik und in etwas geringerem Grade auch bei der Original Sachs-Georgi-Reaktion manchmal unspezifische Ausfälle, ein Befund, der, wie wir bereits früher bemerkt haben, zum Teil auf Verwendung von Retroplacentarblut zurückzuführen sein dürfte, aber doch sich den entsprechenden Ergebnissen der früheren Untersuchungen prinzipiell anschliesst. Die D.M. erwies sich uns als die spezifischeste der Flockungsmethoden. Die meisten Luesfälle wurden nach der Dreyer-Methode angezeigt, deren Resultate also in dieser Hinsicht denen der Komplementbindungsreaktion am nächsten kommen. Allerdings müssen wir hinzufügen, dass aus Ursachen, die wir bisher nicht aufdecken konnten, die Sachs-Georgi-Original-Technik bei uns eine im Verhältnis zu anderen Publikationen so geringe Ausfallsbreite bei Lues zeigte, dass wir hiefür einen — vielleicht ganz unbedeutenden — äusseren Grund verantwortlich machen zu müssen glauben. Man dürfte daher unsere Ergebnisse mit der Sachs-Georgi-Reaktion nicht ohneweiters als Gradmesser für diese Methode ansehen. Von Interesse scheint es uns aber, dass in einem Laboratorium, welches mit Komplementbindungsreaktion und den verschiedenen Flokkungsreaktionen mindestens gleiche, meistens aber bessere Durchschnittsergebnisse bei Lues erzielte als viele andere Laboratorien, gerade diese eine ungemein einfache Methode nach Sachs-Georgi auffallend schwach arbeitete. Unsere Bemühungen den Grund für dieses Missverhältnis zu finden waren bisher erfolglos. Möglicherweise ist das hier verwendete Wasser schuld oder der etwas veränderliche Gasdruck, der die gerade für Sachs-Georgi so notwendige Temperaturkonstanz nicht völlig verbürgt.

Resultate der speziellen Vergleichsuntersuchungen nach dem Programm der Pariser Konferenz.

Ad Punkt 1. Wir bereiteten einen Sigma-Extrakt, indem wir Rinderherz als Ausgangsmaterial wählten, im übrigen aber ganz nach der Vorschrift von Dreyer verfuhren. Nach Verdünnung mit Kochsalz zeigte dieser Extrakt zwar ein etwas klareres Aussehen als der Original-Sigma-Extrakt, wich

aber in seinen Ergebnissen nicht wesentlich von den Resultaten des letzteren ab. Andererseits stellten wir aus Kalbsherz den Sachs-Georgi-Extrakt her, der einzelnen Sachs-Georgi-Extrakten aus Rinderherz sogar ein wenig überlegen war.

Ad Punkt 2. Um die optimale Verdünnungsart kennen zu lernen, verdünnten wir einen Sigma-Extrakt einerseits nach der Originaltropftechnik von Dreyer, andererseits nach der zweizeitigen Bereitungsart von Sachs, wählten aber als zweite Kochsalzportion nicht wie bei der Sachs-Georgi-Reaktion 4 ccm, sondern 33 ccm Kochsalz, damit die Mengenverhältnisse gegenüber der Original-Sigma-Reaktion unverändert blieben. Die von Dreyer vorgeschreibene Tropftechnik ergab uns sowohl was die Stärke, als auch was die Spezifität betrifft, die besten Resultate. Auf die Ergebnisse verschiedener anderer von uns geprüfter Variationen, die auch die übrigen Punkte des Programms berühren, wollen wir hier nicht eingehen. In den Mitteilungen an die Pariser Konferenz zeigten wir schon, dass für die Eigenschaften eines Extraktsols das Alkohol-Wasser-Verhältnis von grundlegender Bedeutung ist, das bei dessen Bereitung besteht.

Wenn man z.B. bei der D.M. die erste Phase nicht im Verhältnis von EIN Teil Extrakt zu 0,5 Wasser, sondern mit einer anderen Wassermenge ansetzt, so resultiert ein Extrakt von anderen kolloidalen Eigenschaften und anderer Empfindlichkeit.

Das Verhältnis 1 : 0,5 ist für den Meinicke-Extrakt der kritische Punkt. Es gibt nun auch für die Lipoidextrakte der anderen Reaktionen einen kritischen Punkt, d.h. ein bestimmtes Verhältnis von Alkohol des Stammextraktes zur Menge des zur Verdünnung benützten Wassers, das für den schliesslichen kolloidalen Zustand und damit für die Wirksamkeit des Antigens von entscheidender Bedeutung ist. Je nach Lipoid- und Cholesterinmenge kann dieser kritische Punkt ein wenig schwanken, wird sich jedoch immer in den Grenzen von ein Teil Alkohol zu 0,4–1,2 Wasser halten. Eine zweiphasige Verdünnung muss immer trachten, in der ersten Phase dieses Optimum, das wir als kritischen Punkt bezeichnet haben, zu treffen. Bei der einzeitigen Verdünnung kann dieses optimale Verhältnis zwischen Alkohol und Wasser nur

dann wirksam getroffen werden, wenn die Verdünnung langsam, insbesondere tropfenweise vorgenommen wird, da ja die Entstehung der entsprechenden optimalen kolloidalen Dispersität eine gewisse Zeit benötigt und bei rascher Verdünnung das Optimum förmlich übersprungen wird. Ist einmal das Optimum erreicht, dann spielt die weitere Verdünnungsgeschwindigkeit keine wesentliche Rolle mehr. So wird es auch bei der Bereitung des Original-Dreyer-Extraktes nach der von dem Autor verlangten Tropfmethodik nur von Wichtigkeit sein, ungefähr 1-2 ccm wirklich tropfenweise zu 1 ccm Stammextrakt zuzusetzen. Der Rest der Verdünnungsflüssigkeit kann rasch gegossen werden, ohne dass in der Wirksamkeit des so entstandenen Extraktes ein wesentlicher Unterschied gefunden werden könnte.

Ad Punkt 3. Wir fanden einen nur unwesentlichen Unterschied zwischen der Versuchsanordnung im Wasserbad und im Brutschrank. Die bei ersterer manchmal zu konstatierende Verstärkung erwies sich uns als nicht von essentieller Bedeutung.

Ad Punkt 4. Zwischen Inaktivierung von $\frac{1}{2}$ und $1\frac{1}{2}$ stündiger Dauer zeigte sich insofern keine prinzipielle Differenz, als wir keinen Fall von Lues fanden, der nur mit einer der beiden Inaktivierungszeiten positiv, mit der andern negativ reagierte. Hingegen führte insbesondere bei der Sigma-Methodik manchmal die halbstündige, manchmal die anderthalbstündige Inaktivierungszeit zu einer Verstärkung. Diese Verstärkung war häufig nicht gleichmässig bei allen Serumdosen zu sehen, sondern sie zeigte sich oft nur in den kleineren, in anderen Fällen mit der gleichen Inaktivierungszeit nur in den höheren Serumdosen.

Ad Punkt 5. In den Originalröhrchen nach Dreyer-Ward lässt sich das Resultat bei entsprechender Beleuchtung besser ablesen als in den gewöhnlichen Präzipitationsröhrchen.

Ad Punkt 6. Die Ablesung nach 40-48 Stunden ergab zwar in vielen Fällen Verstärkung der Resultate, doch war diese Verstärkung nicht von essentieller Bedeutung und es liess sich wohl bei allen Fällen von Lues, die nach 48 Stunden positiv reagierten, auch nach 24 Stunden geringe Flockung

nachweisen. Im allgemeinen können wir, abgesehen von den Unannehmlichkeiten der langen Versuchsdauer, die späte Ablesung deshalb nicht empfehlen, weil es dabei auch nicht allzu selten bei Nichtluesfällen zu geringer Flockung kommen kann. Wir kommen also zu dem Schlusse, dass der Vorteil eventueller Verstärkung mindestens wettgemacht wird, durch den Nachteil einer, wenn auch nur geringen Flockung von Nichtluesfällen bei späterer Ablesung.

Ad Punkt 7. Von praktischer Wichtigkeit erscheinen uns Untersuchungen über die quantitativen Verhältnisse zwischen Serum und Extrakt (wobei wir nur die absoluten Quantitäten und nicht die Oberflächenverhältnisse meinen, da ja letztere eher in den Punkten über Verdünnungsart zu besprechen sind).

a) *D.M.* Nach unseren Untersuchungen scheint es notwendig, die Serummenge zu variieren. Ausser der vorgeschriebenen Menge von 0,2 Serum soll auch 0,1 und 0,4 Serum gebraucht werden. Die doppelte Serummenge ist deshalb notwendig, weil manche Fälle von Lues nur in diesem Verhältnis reagieren, wobei die Spezifität genügend gewahrt bleibt. Eigentümlich verhält sich die D.M. bei Verwendung der halben Serumdosis (0,1) oder, was dasselbe ist, bei Verwendung doppelter Antigendosis gegenüber 0,2 Serum. Wohl wird auch hier bei einzelnen Luesfällen durch dieses Verschieben des Serumextraktverhältnisses zu Ungunsten des Serums eine Verstärkung erzielt. Jedoch zeigte sich bei diesem Arbeiten mit halben Serummengen auch hie und da bei nichtluetischen Fällen eine manchmal recht deutliche Flockung, so zwar, dass ein Ausfall, der mit halber Serummenge stark positiv, mit der Normalserummenge 0,2 viel schwächer positiv oder gar negativ reagiert, zur äussersten Vorsicht in der Beurteilung mahnt.

b) *Sachs-Georgi.* — Die ursprünglich angegebene Dosis von 0,1 Serum ist sicherlich zu gering. 0,2 zeigt bei manchen Luesfällen positiven Ausfall, wo 0,1 negativ reagiert, ohne dass hiebei die Spezifität leidet. Weitere Erhöhung der Serumdosis bis 0,5 scheint nach unseren Untersuchungen von Vorteil. Einesteils sind die positiven Resultate viel deutlicher ablesbar, andererseits ergeben gar nicht so selten Luesfälle,

die mit 0,2 Serum negativ ausfallen, ein positives Resultat, ohne dass durch diese Serumerhöhung die Unspezifität vermehrt würde. Allerdings muss diese wichtige Frage an noch grösserem Material geprüft werden. Bei weiterer Erhöhung der Serummenge beginnt die Reaktion unspezifisch zu werden.

c) *Sigma-Reaktion.* — Die quantitativen Verhältnisse der β-Reihe sind von Dreyer und Ward bereits in der Versuchsanordnung genügend berücksichtigt. Unser Interesse wandte sich dem α Extrakt zu und wir versuchten den Unterschied gegenüber den ersten Röhrchen der β-Reihe quantitativ zu deuten. Man muss sich hiezu die Mengenverhältnisse bei der Bereitung der beiden Extraktarten vergegenwärtigen. Zu je 1 ccm Lipoidextrakt werden bei der Bereitung von α 10,7, bei der Bereitung von β 34 ccm Kochsalz zugesetzt, so dass α etwa einer 12fachen, β einer 35fachen Verdünnung entspricht. In gleicher Menge Gebrauchsextrakt ist also bei α der Lipoidgehalt etwa dreimal so hoch als bei β. Dagegen wird aber von α Extrakt weniger zugesetzt, nämlich nur 6 Tropfen auf 20 Tropfen Serum oder, um den Vergleich mit dem ersten β Röhrchen zu erleichtern, 3 Tropfen Extrakt auf 10 Tropfen Serum während bei β 15 Tropfen Extrakt auf 10 Tropfen Serum kommen. Die Lipoidmenge des Alphaextraktes ist also wohl dreifach grösser als die einer gleichen Menge des β Extraktes. Da aber nur der 5. Teil von α im Vergleich mit β verwendet wird, beträgt die Lipoidmenge in α-Röhrchen dreifünftel derjenigen in β-Röhrchen. Durch dieses Herabgehen mit der Lipoidmenge im α-Röhrchen gegenüber dem ersten Röhrchen der β-Reihe, wird also ein relativer Serumüberschuss erzielt. So betrachtet stellt demnach das α-Röhrchen nur eine Fortsetzung der ansteigenden β-Reihe vor. Dass diese Schlussfolgerung richtig ist, konnten wir aus entsprechenden Versuchen erkennen, bei denen wir die β-Reihe um 1 Röhrchen mit 20 Tropfen Serum und 15 Tropfen Extrakt vermehrten. (Um Serum zu sparen kann man diesen Versuch auch mit halben Mengen ausführen.) Tatsächlich fanden wir, dass ungefähr die gleichen Resultate in diesem 5. β-Röhrchen erhalten wurden, wie in dem α-Röhrchen. Von besonderem Interesse war hiebei die Tatsache, dass in jenen Fällen, in denen das α-Röhrchen schwächere Aus-

fälle zeigte als das erste β-Röhrchen die gleiche Abschwächung auch durch die beschriebene Versuchsanordnung mit dem verstärkten β-Röhrchen eintrat. *Es zeigt sich also, dass das Wesentliche bei der Verwendung des α-Röhrchens auf nichts weiter als auf einer relativen Serumvermehrung beruht.* Wir glauben, dass auf diese Weise eine nicht unwesentliche Vereinfachung der quantitativen Versuchsanordnung bei der Sigma-Methodik zu erzielen ist. Geringe Differenzen der beschriebenen Modifikation gegenüber dem Original α-Röhrchen sind durch Konzentrationsunterschiede zu erklären, wobei es nach unseren Ergebnissen wohl möglich erscheint, dass diese Differenzen nicht zu Ungunsten der von uns vorgeschlagenen Versuchsanordnung sprechen.

Ad Punkt 8. Zwischen der Verwendung der Tropf- und der Messpipetten ergab sich kein Unterschied.

5.

RAPPORT SUR LES TRAVAUX PRESCRITS A LA RÉUNION DE PARIS EN NOVEMBRE 1922.

Dr Ernest Renaux (Institut Pasteur de Bruxelles).

Les recherches ont porté sur 2147 échantillons de sérum, après élimination d'une bonne centaine de cas pour lesquels les renseignements fournis furent insuffisants.

Ces 2147 cas se décomposent comme suit:

Syphilis certaine à divers stades:	1470;	
Syphilis possible:	71;	
Affections diverses en l'absence de tout commémoratif et de tout symptôme de syphilis acquise ou héréditaire:	606.	Ensemble: 2147.

Les indications générales données dans notre rapport du 17 mai dernier n'ont pas varié. Nous pouvons donc les reprendre telles quelles: il s'agit des modifications apportées soit à la technique, soit au mode de préparation des réactifs des réactions de floculation, ou bien encore à l'emploi pour l'une des réactions de floculation des réactifs recommandés pour l'autre, et vice versa.

1. Réaction de Sachs-Georgi, pratiquée simultanément et comparativement à l'étuve et au bain-marie : résultats sensiblement identiques. La seule différence nette est une vitesse de réaction plus grande au bain-marie.

2. Réaction de Sachs-Georgi: deuxième lecture après 48 heures. Il a été constaté de fausses floculations nombreuses. L'infection donne fréquemment des flocons même dans les tubes de contrôle.

3. Réaction de Sachs-Georgi pratiquée avec l'antigène *b* de Dreyer: la sensibilité est tout à fait insuffisante.

4. Réaction de Sachs-Georgi pratiquée avec l'antigène de Dreyer dilué suivant la technique de Sachs: la sensibilité est tout à fait insuffisante.

5. Réaction de Sachs-Georgi pratiquée avec l'antigène de Sachs dilué suivant la technique de Dreyer *b*: la sensibilité est vraiment minime.

6. Sigmaréaction pratiquée avec l'antigène de Sachs: les résultats sont irréguliers: seuls, les sérums fortement positifs donnent une bonne floculation.

7. Sigmaréaction pratiquée au thermostat à 37°: les résultats sont nettement inférieurs à ceux de la technique habituelle.

8. Sigmaréaction pratiquée avec l'antigène de Sachs dilué suivant la technique de Dreyer: les résultats sont assez favorables, mais la lecture est plus difficile que dans la méthode originale. Flocons plus petits.

9. Modification de la vitesse de mélange pour la préparation des antigènes de Dreyer: on peut atteindre sans inconvénient une vitesse double de celle indiquée par les auteurs Il semble défavorable d'accentuer la vitesse au delà de cette limite.

Depuis le dépôt du rapport préliminaire, d'autres essais ont, en outre, été effectués:

a) Réaction de Sachs-Georgi pratiquée avec un antigène de foie de fœtus hérédo-syphilitique préparé par Latapie à Paris: les résultats ne furent pas favorables, cet antigène ayant une très forte tendance à l'auto-floculation.

b) Remplacement de l'antigène de Dreyer par un antigène non cholestériné: On obtient des résultats très encourageants en substituant, pour la sigmaréaction, à l'antigène cholestériné un antigène de cœur de veau préparé en suivant une technique très voisine de celle utilisée pour la préparation de l'antigène Bordet-Ruelens: extraction à l'acétone, puis épuisement à l'alcool. On dilue cet antigène de la manière indiquée par Dreyer et Ward, mais sans addition préalable de cholestérine. Les floculations sont parfois un peu moins intenses, mais le mélange reste plus limpide, ce qui favorise la lecture.

Les seules différences observées, dans 120 cas, entre cet antigène et celui de Dreyer et Ward sont les suivantes:

N° 1872: S. latente: Sigmaréaction: +(1,7 U); Nouvel antigène: —.
N° 1916: Pas de syphilis: Sigmaréaction: +(1 U); Nouvel antigène: —.
N° 1951: S. latente: Sigmaréaction: —; Nouvel antigène: +.
N° 2102: S. en traitement: Sigmaréaction: + (1,8 U); Nouvel antigène: ?.

Quelques points nous paraissent dignes d'être spécialement relevés: Les résultats d'ensemble ne diffèrent pas sensiblement, comme pourcentage relatif, des résultats indiqués, l'an dernier, à Paris; mais peut-être y aura-t-il lieu, surtout en ce qui concerne le Bordet-Wassermann et la Sigmaréaction de faire quelques remarques. Nous n'insisterons pas longuement sur la réaction de Sachs-Georgi, qui a pour elle le grand avantage de la simplicité, mais a donné des résultats plus faibles que précédemment.

Nous avons eu l'impression que les antigènes que le professeur Sachs a eu l'amabilité de nous envoyer pendant cette période étaient nettement moins actifs que les autres. Pourtant, la technique que nous avons suivie s'est inspirée aussi étroitement que possible des recommandations formulées par l'auteur.

Nous appellerons l'attention sur les réactions de Bordet-Wassermann que les protocoles d'analyse indiquent comme « négatives avec retard d'hémolyse » et qui, dans la statistique, sont portées simplement comme négatives. Ces réactions très faibles coïncident, dans 50 % des cas, avec des Sigmaréactions positives faibles. Voici, au surplus, la proportion de *réactions négatives avec retard d'hémolyse* rencontrées parmi les 2147 sérums examinés:

	Syphilis certaine	Syphilis possible	Pas de syphilis
Avec Sigmaréaction positive	25	8	3
Avec Sigmaréaction négative	20	4	12
Soit, sur un total de 72 cas	45	12	15

Il s'agit, en somme, d'un résultat, dont on ne peut tenir compte lorsque l'anamnèse et l'examen clinique ne révèlent pas l'existence de la syphilis, mais qui prend une certaine importance dans le cas inverse. En d'autres termes, il y a là une réaction qui se trouve à la limite de la spécificité. Or, il ne faut pas perdre de vue que les résultats de la Sigmaréaction montrent un nombre relativement élevé de cas susceptibles de la même interprétation et, notamment, ceux où le diagnostic positif est donné par une floculation apparaissant après 48 heures seulement. Le fait est surtout évident quand on remarque que, sur les 27 cas où la Sigmaréaction fut positive en l'absence de syphilis reconnue, 22 n'ont donné la floculation qu'après 48 heures et si, sur ces 22 cas, l'intensité dépasse l'unité 5 fois (N° 229: 3,2 U; N° 1900: 1,8 U; N° 173: 1,6 U; N^{os} 864 et 1275: 1,4 U), dans tous les autres elle lui fut inférieure. Il nous semble qu'il y a là un élément dont il faut tenir compte. La lecture après 48 heures est, d'ailleurs, souvent peu précise par suite d'infection surajoutée et cela surtout pendant la période estivale.

Autre remarque au sujet de la Sigmaréaction: l'appréciation de l'intensité des résultats n'est pas toujours aisée, elle laisse place parfois à des hésitations d'autant plus justifiées que certains chiffres fournis par le tableau de Dreyer concordent mal avec l'état clinique.

Exemp. No	Lecture après 24 heures					Lect. ap. 48 h.			Unités	Diagnostic
	1	2	3	4	5	1	2	3		
1628	?	?	?	*S*—	*tr*	—	—	—	11,3	Syphilis possible, mais non certaine.
1630	0	?	?	*tr* +	0	—	—	—	9,6	Pas de syphilis.
1897	*tr*	?	0	?	*S*—	—	—	—	23	S. en traitement
2005	0	0	0	0	*tr*	*tr* +	0	0	16,2 ou 0,62	S. latente.
2011	0	0	0	*tr* +	*tr*	0	0	*tr* ?	9,6 ou ?	S. latente.
2025	0	0	0	0	0	0	0	*S*—	2,8	Pas de diagnost.
2026	0	0	0	0	*S* +	—	—	—	34	Pas de diagnost.
2116	0	0	0	0	0	*S* ?	?	0	0,78 ou ?	Démence, pas de S.

Certes, il serait recommandable, dans ces circonstances, de faire un nouvel essai. Dans quelques cas, cela nous a été possible avec, d'ailleurs, résultat concordant. Mais les conditions un peu spéciales qui régissent notre mode de travail ne nous laissent pas toujours cette faculté. Il en est, en somme, fréquemment ainsi pour la pratique du diagnostic de la syphilis hors de l'hôpital.

Signalons encore, à propos de la Sigmaréaction, que l'établissement d'un tube-contrôle du sérum s'est montré tout à fait inutile, sauf, peut-être pour la période estivale où les fausses floculations par infection sont plus à craindre.

Tableau d'ensemble des résultats coopératifs des réactions de Bordet-Wassermann, Sachs-Georgi et Sigmaréaction (2147 cas)

Détail des cas	Nomb.	Bordet-Wassermann			Sachs-Georgi			Sigmaréaction		
		Pos.	Dout.	Négat.	Pos.	Dout.	Négat.	Pos.	Dout.	Négat.
S. I non traitée	19	18	0	1	16	1	2	18	0	1
S. II non traitée	30	30	0	0	30	0	0	30	0	0
S. III non traitée	63	59	0	4	56	2	5	61	0	2
S. latente	858	323	1	534	279	42	537	502	2	354
Tabes	34	19	0	15	18	2	14	23	0	11
Dém. paral.	4	4	0	0	2	0	2	4	0	0
Syph. en traitem.	462	200	1	261	157	23	282	301	1	160
S. total	1470	653	2	815	558	70	842	939	3	528
S. possible	71	16	1	54	24	2	45	46	0	25
Contrôles	606	4	1[1]	601	11	9	586	27	1	578

[1] Anticomplémentaire total.

Détail des cas de contrôle ayant donné un résultat positif dans l'une ou l'autre des réactions pratiquées.

Réaction de Bordet-Wassermann.

N° 488: réaction positive faible. Angine pultacée avec température élevée. A donné une réaction de S.G. positive faible et une Sigmaréaction négative.

N° 933: réaction positive faible. Eruption cutanée de nature indéterminée. S.G. et Sigma négatives.

N° 991: réaction positive moyenne. Polyadénite. S.G. et Sigma négatives.

N° 1541: réaction positive faible. Sujet bien portant. S.G. et Sigma négatives.

Réactions de Sachs-Georgi.

N° 163: réaction positive faible. Sujet bien portant, chute de cheveux. Bordet-Wassermann et Sigma négatives.

N° 235: réaction positive. Méningite tuberculeuse. B.W. négative. Sigma positive.

N° 242: réaction positive. Affection hépatique. B.W. et Sigma négatives.

N° 376: réaction positive faible. Sujet bien portant. B.W. et Sigma négatives.

N° 488: réaction positive faible. Angine pultacée avec température élevée. B.W. positive et Sigma négative.

N° 569: réaction positive. Pleurésie. B.W. et Sigma négatives.

N° 656: réaction positive. Anémie. B.W. et Sigma négatives.

N° 682: réaction positive. Sujet bien portant. B.W. et Sigma négatives.

N° 1018: réaction positive. Bronchite putride. B.W. et Sigma négatives.

N° 1213: réaction positive forte. Phlegmon du genou. B.W. et Sigma négatives.

N° 1629; réaction positive très faible. Encéphalite léthargique B.W. et Sigma négatives.

Remarques. — Un certain nombre de ces réactions positives ne donnaient de floculation que dans le tube contenant la faible dose de sérum. Le nombre de résultats non spécifiques a nettement diminué à partir du moment où l'antigène envoyé a présenté des propriétés floculantes moins marquées.

Sigmaréaction.

N° 91: réaction positive 0,70 après 48 h. Pas de syphilis. B.W. négative et S.G. douteuse (tube témoin flocule).

N° 172: réaction positive 0,78 après 48 h. Tuberculose pulmonaire. B.W. et S.G. négatives.

N° 173: réaction positive 1,6 après 48 h. Néphrite. B.W. et S.G. négatives.

N° 213: réaction positive 0,70 après 48 h. Sujet bien portant. B.W. et S.G. négatives.

N° 219: réaction positive 0,94 après 48 h. Sujet bien portant. B.W. et S.G. négatives.

N° 229: réaction positive 3,2 après 48 h. Pas de syphilis. B.W. et S.G. négatives.

N° 235: réaction positive 27 après 24 h. Méningite tuberculeuse. B.W. négative et S.G. positive.

N° 250: réaction positive 0,78 après 48 h. Epilepsie. B.W. et S.G. négatives.

N° 482: réaction positive 1,1 après 24 h. Ulcère gastrique. B.W. et S.G. négatives.

N° 567: réaction positive 0,78 après 48 h. Dyspepsie. B.W. et S.G. négatives.

N° 690: réaction positive 0,94 après 48 h. Emphysème. B.W. et S.G. négatives.

N° 839: réaction positive 0,94 après 48 h. Sujet bien portant B.W.et S.G. négatives.

N° 850: réaction positive 0,70 après 48 h. Mère ayant un enfant anormal. B.W. et S.G. négatives.

N° 864: réaction positive 1,4 après 48 h. Adénopathie généralisée. B.W. et S.G. négatives.

N° 923: réaction positive 0,70 après 48 h. Pas de S. B.W. et S.G. négatives.

N° 998: réaction positive. 34 après 24 h. Pas de syphilis. B.W. et S.G. négatives.

N° 1066: réaction positive 27 après 24 h. Retard de croissance. B.W. et S.G. négatives.

N° 1087: réaction positive 0,70 après 48 h. Affection nerveuse sans syphilis. B.W. et S.G. négatives.

N° 1197: réaction positive 0,78 après 48 h. Laryngite chronique. B.W. négative retard. S.G. négative.

N° 1275: réaction positive 1,4 après 48 h. Eczéma. B.W. et S.G. négatives.

N° 1492: réaction positive 0,78 après 48 h. Pas de syphilis. B.W. et S.G. négatives.

N° 1630: réaction positive 9,6 après 24 h. Affection hépatique. B.W. et S.G. négatives.

N° 1900: réaction positive 1,8 après 48 h. Néant. B.W. et S.G. négatives.

N° 2017: réaction positive 0,94 après 48 h. Angine. B.W. et S.G. négatives.

N° 2144: réaction positive 0,78 après 48 h. Sujet bien portant. B.W. et S.G. négatives.

N° 2148: réaction positive 0,78 après 48 h. Femme ayant un nourrisson hydrocéphale. B.W. et S.G. négatives.

N° 2181: réaction positive 0,78 après 48 h. Paraplégie. B.W. et S.G. négatives.

6.

BERICHT UBER DIE IM JAHRE 1922-23 VORGENOMMENEN VERGLEICHENDEN DIAGNOSTISCHEN UNTERSUCHUNGEN MIT DEN VERSCHIEDENEN METHODEN DES SEROLOGISCHEN LUESNACHWEISES.

Von Prof. Dr. Hans Sachs (Heidelberg).

Auf Grund der auf der Pariser Serumkonferenz (November 1922) gefassten Beschlüsse wurden in vergleichenden Untersuchungen die Wassermannreaktion, die 3. Modifikation von Meinicke, die Sigma-Reaktion von Dreyer-Ward und die Sachs-Georgi-Reaktion geprüft.

Methodisch wurde im allgemeinen wie im Vorjahre verfahren. Bei Meinickes 3. Modifikation und bei der Sigma-Reaktion wurden die von den Autoren angegebenen Richtlinien genau befolgt und deren Extrakte benutzt. Die Sigma-Reaktion wurde unter Berücksichtigung der ersten 5 Röhrchen (20-1 Tropfen Serum) angesetzt. Bei der Sachs-Georgi-Reaktion konnte auf die in Paris empfohlene Verwendung von 2 Serumdosen verzichtet werden, da sich in praktischer Hinsicht zeigte, dass das Arbeiten mit 5facher Serumverdünnung ausreicht. Dagegen wurden in der Regel 2 verschiedene cholesterinierte Extrakte verwendet.

Die Wassermannreaktion wurde wie im Vorjahre nach den deutschen Reichsvorschriften ausgeführt. Als « vredächtig » (?) wurden daher solche Fälle bezeichnet, bei denen nur bei der Minderheit der verwendeten Extrakte eine völlige oder fast völlige Hemmung der Hämolyse festzustellen war.

Wenn ich zunächst im Folgenden eine tabellarische Uebersicht der vergleichend untersuchten 1203 Serumproben gebe, so möchte ich vorausschicken, dass bei den Luesfällen (I-III) eine begonnene Behandlung nicht immer auszuschliessen ist. Zur Beurteilung der Sigma-Reaktion sei nur erwähnt, dass Flockungen im 1. Röhrchen mit 20 Tropfen aus später zu

erörternden Gründen nicht berücksichtigt wurden, und dass Flockungen im 2. Röhrchen nur dann, wenn sie sehr stark waren, als positiv angesprochen werden konnten.

Die erhaltenen Ergebnisse zeigen die folgende tabellarische Uebersicht.

Tabelle.

	Zahl d. Fälle	Wassermann-reaktion			Meinicke's D.-M.		Sigma		Sachs-Georgi	
		+	?	—	+	—	+	—	+	—
Lues I	45	11	4	30	14	31	14	31	14	31
Lues II	99	75	8	16	79	20	80	19	82	17
Lues III	32	18	4	10	20	12	20	12	20	12
Lues cong.	6	3		3	4	2	4	2	4	2
Lues latens u. behandelte	335	104	44	187	114	221	126	209	126	209
Paralyse	6	5		1	4	2	5	1	5	1
Tabes	11	5	1	5	8	3	7	4	7	4
Lues cerebri	7	5	1	1	3	4	5	2	6	1
Insgesamt	541	226	62	253	246	295	261	280	264	277
Kontrollen	662	2	3	657	4	658	4	658	4	658
Insgesamt	1203	228	65	910	250	935	265	938	268	935

Fasst man die Ergebnisse in Bezug die %-Zahl der positiven Reaktionen bei Syphilis zusammen, so reagierten von 541 Syphilitikern positiv:

bei der Wa.-R. . . . . 47,8 %
mit Einschluss der fraglichen Fälle (11,5 %) . . . 53 %
bei der D.-M. . . . . 45,5 %
bei der Sigma-R. . . . . 48,3 %
bei der Sachs-Georgi-R. . . . . 48,8 %

Es ergibt sich also, dass die Flockungsreaktionen, wofern man nur die einwandfrei positiven Ausfälle der Wassermannreaktion berücksichtigt, etwas empfindlicher sind als die letztere. Spricht man allerdings auch die bei der Wassermannreaktion verdächtigen Fälle als positiv an, so erscheint die Wassermannreaktion etwas empfindlicher als die Ausflockungsreaktionen. Unter den letzteren ist Meinickes 3. Modifikation in Bezug auf Empfindlichkeit etwas unterlegen, während

Sigma- und Sachs-Georgi-Reaktion eine fast übereinstimmende Empfindlichkeit aufweisen.

Besondere Hervorhebung verdient der Umstand, dass Differenzen in erheblich grösserem Masse zum Ausdruck gelangen, als es nach der voranstehenden Uebersicht scheinen könnte. Dabei wurden Differenzen in allen Stadien der Syphilis beobachtet, wenn sie auch bei den latenten und behandelten Fällen dominierten.

Im Einzelnen ergaben sich:

bei *Lues I:* 7 Differenzen, und zwar:

1 Fall nur Wa.-R. positiv
2 Fälle » Wa.-fraglich, sonst negativ
2 » » » » positiv
1 Fall » Sachs-Georgi u. D.-M. pos., sonst neg.
1 » » » u. Sigma » » »

bei *Lues II:* 11 Differenzen, und zwar:

2 Fälle nur S.-G. positiv
5 Fälle Wa.-fragl., sonst positiv
3 » » » » negativ
1 Fall nur D.-M. negativ

bei *Lues III:* 4 Differenzen, und zwar:

1 Fall Wa.-fragl., sonst positiv
1 » » » » negativ
1 » » » S.-G. pos., sonst neg.
1 » nur S.-G. negativ

bei *Lues congenita:* 1 Differenz, und zwar:

Wa.-negativ, sonst positiv

bei *Lues latens:* 81 Differenzen, und zwar:

13 Fälle Wa.-fragl., sonst positiv
11 » » S.-G. pos., sonst neg.
2 » » Sigma pos., sonst neg.
5 » » D.-M. neg., sonst pos.
5 » » S.-G. neg., sonst pos.

1 Fall Wa.-fragl., Sigma neg., sonst pos.
2 Fälle » D.-M. pos., sonst neg.
5 » » sonst negativ
3 » Wa.- und Sigma pos., sonst neg.
2 » » S.-G. pos., sonst neg.
3 » » S.-G. neg., sonst pos.
1 Fall » D.-M. neg., sonst pos.
7 Fälle nur Wa.-positiv
3 » » Sigma positiv
4 » » D.-M. positiv.
2 » » Wa.-negativ
1 Fall » S.-G. negativ
3 Fälle » Sigma negativ
8 » » D.-M. negativ

bei *Paralyse:* 1 Differenz, und zwar:

nur D.-M. negativ

bei *Tabes:* 4 Differenzen, und zwar:

1 Fall Wa.-fragl., sonst positiv
1 » Wa.- und S.-G. neg., sonst positif.
1 » nur Sigma negativ
1 » » Wa. negativ

bei *Lues cerebri:* 3 Differenzen, und zwar:

2 Fälle nur D.-M. negativ
1 Fall Wa.-fragl., S.-G. pos., sonst neg.

Was die positiven Reaktionen bei den Kontrollfällen anlangt, so ist Syphilis hierbei nicht mit Sicherheit auszuschliessen. Bemerkenswerterweise handelt es sich aber bei den insgesamt 12 Fälle umfassenden positiven Ergebnissen in den Kontrollen um differente Ergebnisse, die sich in Bezug auf Diagnose und Verhalten bei den eizelnen Methoden folgendermassen verteilen:

1. Angina pectoris: nur Sigma positiv
2. Encephalitis: » » »
3. Herzinsuffizienz: » » »
4. Gonorrhöe: » » »
5. Ulcus duodeni: » D.-M. »

6.	Cystitis:	nur D.M. positiv
7.	Furunkulose:	» Wa. »
8.	Tuberculosis pulm.	» D.M. und Sigma positiv
9.	Furunkulose:	» Wa. und S.-G. positiv
10.	Gicht:	Wa.-fragl., S.-G. pos., sonst negativ
11.	Epilepsie:	Wa.-fragl., S.-G. pos., sonst negativ
12.	Episcleritis:	Wa.-fragl., D.M. pos., sonst negativ.

Es scheint also, dass man vor ganz seltenen unspezifischen Reaktionen bei keiner Methode mit absoluter Sicherheit geschützt ist. Es handelt sich aber zweifellos um so seltene Vorkommnisse, dass sie die diagnostische Verwertbarkeit nicht ernstlich beeinträchtigen. Ausserdem ist in den angegebenen Fällen eben immer nur bei einzelnen Verfahren die Reaktion positiv gewesen.

Allerdings würde sich, wie schon erwähnt, bei Berücksichtigung des 1. und zum Teil auch des 2. Röhrchens der Sigma-Reaktion eine gehäufte Zahl unspezifischer Reaktionen ergeben haben, freilich mit einer Steigerung der Empfindlichkeit vergesellschaftet. Wie schon erwähnt, sind derartige Flockungen der ersten beiden Röhrchen in der voranstehenden Uebersicht nicht als positiv berücksichtigt worden. Zur Begründung seien im Folgenden aus einem grösseren Ausschnitt der Versuche, in denen bei negativem Ergebnis der übrigen Methoden die Sigma-Reaktion nur in den ersten 2 Röhrchen Flockung aufwies, die Reaktionsgrade in Sigma-Einheiten angeführt.

Bei der Ablesung nach 24 Stunden handelte es sich um 147 Sera, die derart eine Flockung aufwiesen. Bei 108 Serumproben betrug die Zahl der Einheiten höchstens 1,5, so dass in diesen Fällen die Ergebnisse nach den Vorschriften von Dreyer und Ward nicht als positiv zu bewerten waren. Von den 39 mehr als 1,5 Sigma-Einheiten ergebenden Sera waren 16 sichere Luesfälle, und zwar:

Lues latens	1,6	Lues behandelt . . .	3,2
» »	3,2	» » . . .	3,2
» »	2,2	» II	2,2

Lues latens	2,2	Lues latens	1,6
» »	3,2	» II	3,2
»	1,8	» latens	1,8
» II	2,2	» I	2,2
Keratitis parenchym.	2,2	» behandelt	1,6

Demgegenüber stehen folgende Fälle, bei denen die Diagnose fehlte oder andersartig lautete:

Arteriosklerose	2,2	Gonorrhöe	2,5
Cholelithiasis	3,2	Enuresis noct.	2,2
Kopfschmerzen	3,2	Chorioretinitis	1,6
Cholelithiasis	3,2	Adipositas	1,6
Gastritis	2,2	Pernic. Anämie	1,6
Ekzem	1,6	Neurasthenie	1,6
Gonorrhöe	1,6	Tuberkulose	2,2
Hornhautentzündung	1,6	Lebercirrhose	1,8
Prurigo	1,6	Diagnose fehlt	1,6
Wöchnerin	2,2	Ulcus molle	1,8
Diagnose fehlt	2,2	Ulcus?	1,8
		Cholelithiasis	1,6

Wenn also auch zweifellos durch die Mitberücksichtigung des 1. und unter Umständen auch des 2. Röhrchens eine grössere Zahl von Syphilisfällen erfasst werden, so scheint doch die Gefahr zu bestehen, dass auch die Zahl der unspezifischen Reaktionen eine Vermehrung erfährt. Zwar lässt die Art des zur Verfügung stehenden Materials den Ausschluss von Syphilis nicht ohne weiteres zu, die Häufung von positiven Reaktionen bei bestimmten Krankheitsformen (Cholelithiasis, entzündliche Prozesse, Puerperium) dürfte aber doch bei Berücksichtigung des 1. und vielleicht auch des 2. Röhrchens bei der Dreyer-Ward-Methode zur Vorsicht mahnen.

Was die *Ablesung nach* 48 *Stunden* anlangt, so handelt es sich um 155 Sera, die in den ersten 3 Röhrchen bei negativem Ergebnis der übrigen Methoden positiv reagierten. Von ihnen hatten 106 Werte von über 1,1. Ordnet man diese Sera nach den einzelnen Reaktionsgraden, so ergeben sich:

Mit der Reaktionsstärke 1,2*:* 26 Fälle, und zwar:
8 Luesfälle und 18 Fälle mit andersartigen Diagnosen:
Akne (2mal), Gonitis, Gelenkrheumatismus, Tuberkulose,

Abscesse, Iritis, Stomatitis, Ulcus ventriculi (2mal), Angina, Abort, Nephritis, Opticus-Atrophie, Milztumor, Diagnose fehlt (3mal).

Mit der Reaktionsstärke 1,4*:* 38 Fälle, und zwar:
13 mit der Diagnose Lues, 25 mit den Bezeichnungen:
Prurigo, Ekzem, Enuresis noct., Chorioretinitis, Anämie (2mal), Chorioiditis, Neurasthenie, Herzinsuffizienz, Balanitis, Neuritis, Lebercirrhose, Hornhautentzündung, Furunkulose, Dermatitis, Depression, Arteriosklerose, Abort, Hypertonie, Tuberkulose, Cholelithiasis, Pneumonie, Diagnose fehlt (3mal).

Mit der Reaktionsstärke 1,6*:* 17 Fälle, und zwar:
5 mit der Diagnose Lues, 12 mit der Bezeichnung:
Anämie (2mal), Tuberkulose (2mal), Gonorröhe (2mal), multiple Sklerose, Iritis, Aorteninsuffizienz, Ulcus molle, Epistaxis, Diagnose fehlt.

Mit der Reaktionsstärke 1,8*:* 5 Fälle, und zwar:
2 mit der Diagnose Lues, 3 mit der Bezeichnung:
Ulcus, Diagnose fehlt (2mal).

Mit der Reaktionsstärke 2,3*:*
1 Fall mit der Diagnose Cholelithiasis.

Mit der Reaktionsstärke 2,5: 15 Fälle, und zwar:
6 mit der Diagnose Lues, 9 mit der Bezeichnung:
Akne, Wöchnerin (3mal), Abort, Arthritis, Anämie, Neurasthenie, Skleritis.

Mit der Reaktionsstärke 2,8*:*
4 Fälle mit der Bezeichnung:
Polyarthritis, Wöchnerin, Gonorrhöe, Diagnose fehlt.

Auf Grund dieser Ergebnisse erschien es kaum möglich, die nach 48 Stunden abgelesenen Befunde noch zu verwerten. Nach unseren Erfahrungen dürfte aber die Beurteilung nach 24 Stunden hinreichend sein, da wir, abgesehen von den Reaktionsstärken bis 2,8, die wir als charakteristisch nicht mehr ansehen konnten, nach 48 Stunden kaum je positive Befunde erhoben haben, die wir nicht bereits nach 24 Stunden als solche erkennen konnten. Zudem spielte nach unseren Erfahrungen die Eigenflockung in der Serumkontrolle nach 48 Stunden nicht selten eine die Beurteilung erschwerende

Rolle. Jedenfalls würde man, wie wir glauben möchten, bei der Ablesung nach 48 Stunden den Grenzwert der als positiv zu erachtenden Reaktionen heraufsetzen müssen und von positiven Ergebnissen erst dann sprechen dürfen, wenn auch im 3. Röhrchen eine Flockung von mindestens Standard-Grösse (3,2) wahrzunehmen ist. Die seltenen Fälle, in denen das der Fall war, sind in der Zusammenstellung als positiv gewertet worden.

Was die Ablesung nach 24 Stunden anlangt, so konnten wir Werte bis 3,2 in den ersten beiden Röhrchen nach der oben stehenden Uebersicht nicht ohne weiteres als für Lues charakteristisch betrachten. Nach unseren Erfahrungen möchten wir daher glauben, dass das erste Röhrchen (20 Tropfen Serum) für die Beurteilung überhaupt nicht herangezogen werden kann, und dass im 2. Röhrchen ein Wert von mindestens 4,1 (*t*—) zu fordern wäre. Vom 3. Röhrchen (5 Tropfen Serum) an erschienen uns die Ergebnisse auch bei schwacher Flockung verwertbar, und wir haben bei positiven Fällen im 3. Röhrchen auch dann Flockung eintreten sehen, wenn sie in den beiden ersten Röhrchen mit den grösseren Serummengen durch Ueberschusshemmung ausblieb. Zuweilen nahm die Flockung dann allerdings im 4. und 5. Röhrchen nicht unwesentlich zu, so dass uns bei der Sigma-Reaktion die Anordnung mit 5, 2 und 1 Tropfen jedenfalls zweckmässig erscheint. Ob es sich weiterhin empfiehlt, noch ein Röhrchen mit 10 Tropfen anzusetzen, soll *dahingestellt* bleiben.

Zusammenfassend ergibt sich aus den vorliegenden statistischen Erfahrungen in Uebereinstimmung mit denjenigen Befunden, die in der vorjährigen Uebersicht verwertet worden sind, dass die 3. Modifikation von Meinicke an Empfindlichkeit den übrigen Methoden etwas nachsteht. Nun ist die 3. Modifikation ja von Meinicke selbst durch seine neueren Trübungsreaktionen in den Hintergrund gestellt worden. Auch die Trübungsreaktionen wurden von uns fortlaufend geprüft. Die ursprüngliche, mit inaktiviertem Serum arbeitende Trübungsreaktion hat sich auch in unseren Untersuchungen, ebenso wie an anderen Stellen, wegen gehäufter Anzahl unspezifischer Befunde nicht bewährt. Die neuere Meinickesche Trübungsreaktion mit aktivem Serum ist ihr jedenfalls über-

legen. Sie stellt an Einfachheit der Ausführung und an Eleganz der Ablesung ein Verfahren dar, das wohl allen Anforderungen, die man stellen kann, gerecht wird. Es handelt sich bei der Meinickeschen Trübungsreaktion also nur um die Frage, ob sie bei kurzfristiger Ablesung hinreichend charakteristisch und genügend empfindlich arbeitet. In dieser Hinsicht sind unsere, bisher von Dr. Klopstock ausgeführten Versuche noch nicht abgeschlossen. Es haben sich einige Befunde ergeben, die als uncharakteristisch gedeutet werden mussten, es wird aber empfehlenswert sein, gerade diese Methode wegen ihrer Einfachheit und Schnelligkeit zu vergleichenden Versuchen besonders heranzuziehen. Wenn sie auch nach unseren bisherigen Erfahrungen der Ausflockungsreaktion mit cholesterinierten Extrakten in ihren Ergebnissen nicht überlegen sein dürfte, so erscheint doch die fortgesetzte Erprobung wegen der geschilderten Eigenschaften in Bezug auf Technik und Methodik sehr erwünscht.

Was nun die Ausflockungsmethode mit cholesterinierten Extrakten anlangt, so zeigen die von uns erhobenen Befunde einen weitgehenden Parallelismus zwischen Sachs-Georgi- und Sigma-Reaktion. Es ist das von vornherein nicht verwunderlich, wenn man bedenkt, dass beide Methoden mit gleichartigen Extrakten arbeiten und demnach in ihrer Art ausserordentlich nahe stehen dürften. Das Gleiche trifft für die neuerdings in Amerika geübte Ausflockungsreaktion von Kahn zu. Die Methode von Kahn benutzt gleichfalls cholesterinierten Rinderherzextrakt, weicht aber darin ab, dass der Extrakt nur schwach, etwa mit gleichen Teilen physiologischer Kochsalzlösung verdünnt wird und eine verhältnismässig grosse Serummenge an der Reaktion teilnimmt. Wir haben auch diese Methode, bisher allerdings nur in einer beschränkten Anzahl von Fällen, geprüft. Dazu stand uns der von Kahn überlassene Originalextrakt zur Verfügung. Vergleichend haben wir einen eigenen Rinderherzextrakt verwendet, und zwar den Roh-Extrakt, aus dem unser cholesterinierter Rinderherzextrakt II bereitet wurde. Anstatt ihn aber, wie das bei der Sachs-Georgi-Reaktion geschieht, erst 3fach mit Alkohol zu verdünnen und dann zu cholesterinieren, haben wir den ursprünglichen konzentrierten Extrakt choleste-

riniert, indem wir zu 5 cc Extrakt 0,3 cc 1 %iger Cholesterinlösung zufügten. Die mit den beiden Extrakten erhaltenen Resultate waren im allgemeinen übereinstimmend, so dass wohl auch die Methode von Kahn als eine Modifikation der Ausflockung mit cholesterinierten Extrakten betrachtet werden darf. Die Ergebnisse der von Kahn veränderten Anordnung sind dadurch ausgezeichnet, dass die Flocken verhältnismässig rasch und grob auftreten. Die Uebereinstimmung war eine weitgehende, wobei allerdings nach der Methode von Kahn die Ablesung nach kurzer Beobachtungszeit massgebend ist. Jedoch sind wir bei den vergleichenden Untersuchungen von etwa 70 Serumproben einem augenscheinlich unspezifischen Ausfall begegnet. Es handelte sich um einen Fall von Lungentumor, dessen Serum bei den übrigen Methoden negativ reagierte und nur bei der Kahnschen Modifikation positiv ausfiel. Vielleicht wird es sich aber empfehlen, die Modifikation von Kahn wegen der raschen Ablesbarkeit und des grob sinnfälligen Ergebnisses weiter zu Vergleichsversuchen heranzuziehen.

Was die Beziehungen zwischen Sachs-Georgi-Reaktion und Sigma-Reaktion anlangt, so wurde entsprechend den auf der Pariser Serumkonferenz gefassten Beschlüssen in zahlreichen vergleichenden Versuchen geprüft, wie weit die bei der Sigma-Reaktion bestehenden Vorschriften als wesentlich für die Methode erscheinen müssen. Diese Vergleichsversuche konnten sich naturgemäss immer nur auf eine begrenzte Auswahl von Serumproben erstrecken. Die erhaltenen Ergebnisse können daher keinen absoluten Wert beanspruchen, dürften aber doch das Verständnis der Beziehungen und der Verwandtschaft fördern und dazu beitragen, die Ausflockungsreaktion mit cholesterinierten Extrakten möglichst zweckentsprechend auszugestalten.

Bezüglich der quantitativen Verhältnisse ist schon erwähnt worden, dass bei der Sigma-Reaktion eine Versuchsreihe mit 3 Serumdosen (5-1 Tropfen), höchstens mit 4 Serumdosen (10-1 Tropfen) ausreicht, dass aber auch eine mittlere Serumdosis von 5 Tropfen für die Bedürfnisse in der Praxis im allgemeinen eine hinreichende Gewähr bietet.

Im Einzelnen wurden folgende Bedingungen noch näher geprüft:

1. *Die Bedeutung der Abmessung mittels Tropfen.* — In vergleichenden Untersuchungen wurde die Sigma-Reaktion einerseits genau nach den Vorschriften von Dreyer und Ward, andererseits unter Benutzung von Messpipetten angesetzt, und zwar unter Berücksichtigung der angegebenen Mengenverhältnisse nach folgendem Schema:

1. Röhrchen: 0,8 cc Serum + 0,2 cc Extraktverdünnung α,
2. Röhrchen: 0,4 cc Serum + 0,6 cc Extraktverdünnung β,
3. Röhrchen: 0,2 cc Serum + 0,6 cc Extraktverdünnung β + 0,2 cc. Kochsalzlösung,
4. Röhrchen: 0,4 cc 5fach verdünntes Serum + 0,6 cc Extraktverdünnung β,
5. Röhrchen: 0,2 cc 5fach verdünntes Serum + 0,6 cc Extraktverdünnung β + 0,2 cc Kochsalzlösung.

Vergleichende Prüfung dieser Anordnung mit der Tropfmethode ergab absolute Uebereinstimmung, auch in quantitativer Hinsicht. Das Arbeiten mit Messpipetten bedeutet aber eine erhebliche Ersparnis an Zeitaufwand. Es ist daher unseres Erachtens von Vorteil, die Sigma-Reaktion mit Messpipetten auszuführen.

2. *Bedeutung der Inaktivierungszeit.* — Wir haben vergleichsweise zur Sigma-Reaktion die Sera nach ½stündiger und 1 ½ stündiger Inaktivierung benutzt. In unsern Versuchen ergab sich hierbei kein gesetzmässiger Unterschied; in quantitativer Hinsicht reagierten einige Sera nach ½ stündiger, einige andere nach 1 ½ stündiger Inaktivierung stärker. Bei der Sachs-Georgi-Reaktion haben wir im allgemeinen nach 1 ½ stündiger Inaktivierung eher eine Abschwächung der Reaktionsstärke beobachtet. Wenn auch nach unseren vorläufigen Erfahrungen auch für die Sigma-Reaktion die ½ stündige Inaktivierung ausreichend sein dürfte, so wird es doch weiterer Erfahrungen bedürfen, um diese Frage zu entscheiden.

Wir haben ausserdem, allerdings nur bei der Wassermann-Reaktion und bei der Sachs-Georgi-Reaktion, die Frage ge-

prüft, ob man mit einer kurz dauernden Inaktivierung bei höherer Temperatur auskommen kann. Die zahlreichen, von Dr. Takenomata ausgeführten Versuche haben dabei ergeben, dass bei den beiden genannten Methoden 5 Minuten langes Inaktivieren bei 60° zu gleichen Ergebnissen führt, wie ½ stündiges Inaktivieren bei 55°. Durch eine derartige Abkürzung der Inaktivierungszeit bei höherer Temperatur wäre insofern ein Vorteil gewonnen, als die Inaktivierung einen geringeren Zeitraum beanspruchen und dadurch, wofern ein einwandfrei reguliertes Wasserbad nicht zur Verfügung ist, eine grössere Exaktheit erzielt werden würde.

3. *Der Einfluss der Extraktverdünnung.* — Bei der Sigma-Reaktion wurde der Extrakt einerseits nach der Vorschrift von Dreyer und Ward, andererseits zweizeitig nach den Angaben von Sachs und Georgi verdünnt. Es ergab sich dabei, dass die Extraktverdünnung nach Dreyer-Ward zweifellos empfindlicher ist als die 2zeitige Extraktverdünnung; umgekehrt führte die Extraktverdünnung bei der Sachs-Georgi-Reaktion mit dem Dreyer-Wardschen Tropfapparat gelegentlich zu einer unspezifischen Ausflockung nach längerer Beobachtung. Diese Befunde dürften der allgemeinen Erfahrung entsprechen, dass für jeden Extrakt die optimale Verdünnungsart erst zu erproben ist. Sie zeigen zugleich, dass sowohl für den Dreyer-Ward-Extrakt als auch für den Sachs-Georgi-Extrakt die angegebenen Verdünnungsarten ein Optimum darstellen.

4. *Vergleich der von Dreyer-Ward und von Sachs-Georgi hergestellten Extrakte.* — Die beiden Extrakte wurden nach den Originalvorschriften verdünnt und mit ihnen sodann die Sigma-Reaktion angesetzt. Das Ergebnis war fast congruent, nur in einem Fall bei dem Extrakt von Dreyer-Ward quantitativ etwas stärker, wogegen der letztere leichter, zumal bei der Ablesung nach 48 Stunden, in den grösseren Serumdosen zu uncharakteristischen Ergebnissen neigte. Ebenso führte ein Versuch, den Sachs-Georgi-Extrakt durch den vorschriftsmässig verdünnten Extrakt von Dreyer-Ward zu ersetzen, bei der Sachs-Georgi-Reaktion zu fast identischen Resultaten. Auch diese Befunde scheinen also für eine Wesensgleichheit beider Methoden zu sprechen, und es dürfte sich in weiteren

vergleichenden Untersuchungen hauptsächlich um die Feststellung der Frage handeln, welcher von beiden Extrakten der geeignetere ist. Für die Sigma-Reaktion würde dabei in Betracht kommen die Extraktverdünnung β durch je 15 Tropfen der zweizeitigen Verdünnung des Sachs-Georgi-Extrakts zu ersetzen, für die Sachs-Georgi-Reaktion anstatt des Sachs-Georgi-Extrakts je 0,25 cc der Verdünnung β des Extrakts von Dreyer-Ward zu verwenden.

5. *Die Bedeutung der Ablesung nach* 24 *und nach* 48 *Stunden.* — In dieser Hinsicht möchten wir sowohl bei der Sachs-Georgi-Reaktion als auch bei der Sigma-Reaktion Bedenken tragen, auf das nach 48 Stunden abgelesene Ergebnis allzu grossen Wert zu legen. Dafür sind uns die schon erwähnten Erfahrungen massgebend, und auch bei der Sachs-Georgi-Reaktion erscheint uns die Ablesung nach 48 Stunden nicht mehr einwandfrei.

6. *Die Bedeutung des Aufenthalts im Brutschrank oder im Wasserbad.* — Zur Klärung dieser Frage wurde die Sigma-Reaktion bei genauer Anordnung nach Dreyer-Ward unter übereinstimmender Verwendung der kleinen Spitzröhrchen einerseits im Brutschrank, andererseits im Wasserbad ausgeführt. Es ergab sich dabei eine quantitative Verstärkung zugunsten des Wasserbades. In entsprechender Weise wurden die Röhrchen bei der Sachs-Georgi-Reaktion einerseits im Brutschrank, andererseits im Wasserbad gehalten; es ergab sich auch hierbei, dass zuweilen durch den Aufenthalt im Wasserbade eine geringgradige Verstärkung erzielt wurde, die jedoch nur einen leicht quantitativen Charakter hatte. Es verdient besondere Hervorhebung, dass bei der Ausführung der Sachs-Georgi-Reaktion im Wasserbade der Röhrcheninhalt vollkommen im Wasser war, während bei der Sigma-Reaktion laut Vorschrift der Inhalt der Röhrchen nur bis zu $^1/_2$ oder $^3/_4$ der Flüssigkeitshöhe im Wasser eintauchte. Ob bei der Sigma-Reaktion etwa gerade durch den nicht im Wasser befindlichen Teil des Röhrcheninhalts eine Verstärkung erzielt wird, muss dahingestellt bleiben. Bei der Sachs-Georgi-Reaktion war der Unterschied zwischen Wasserbad und Brutschrank jedenfalls nicht von wesentlicher Bedeutung. Trotzdem wäre es möglich, dass sich durch Ver-

wendung des Wasserbades eine Verstärkung der Empfindlichkeit erzielen liesse, worüber allerdings erst weitere vergleichende Untersuchungen entscheiden müssen.

7. *Bedeutung der engen Röhrchen (Dreyer-Ward) und der gewöhnlichen Röhrchen (Sachs-Georgi).* — In dieser Hinsicht ist es schwer, zu einem abschliessenden Urteil zu gelangen, und zwar aus dem Grunde, weil die Beurteilung des Ergebnisses in den verschiedenen Röhrchen nicht gleichartig ist und nach unseren Erfahrungen auch je nach den Augenqualitäten des Beobachters differiert. Uebereinstimmend kann man aber sagen, dass der Beleuchtungsapparat von Dreyer-Ward wesentlich nur für die Beurteilung der kleinen Spitzröhrchen vorteilhaft ist. In den gewöhnlichen Reagenzgläsern machte die Beurteilung im Beleuchtungsapparat von Dreyer-Ward Schwierigkeiten, während sie mittels des Kuhn-Woitheschen Agglutinoskops leicht gelang. Bei unseren Ablesungen erwies sich jedoch die Ablesung im Kuhn-Woitheschen Agglutinoskop als empfindlicher. Wurde nämlich nach ordnungsmässiger Ausführung der Sigma-Reaktion der Inhalt der kleinen Spitzröhrchen in gewöhnliche Reagenzgläser umgefüllt und sodann noch einmal im Kunh-Woitheschen Apparat abgelesen, so ergaben sich zuweilen Flockungen, die für uns im Dreyer-Wardschen Beleuchtungsapparat nicht mehr erkenntlich waren. Besonders war das bei feinen Flockungen der Fall, so dass gelegentlich Sera, die bei der Sachs-Georgi-Reaktion positiv, bei der Sigma-Reaktion negativ waren, nach Umfüllung der Sigma-Röhrchen in Sachs-Georgi-Röhrchen gleichfalls als positiv imponierten.

Aus diesem Grunde ist es zu verstehen, dass in unsern Versuchen die Sigma-Reaktion in gewöhnlichen Reagenzgläsern stärker ausfiel als in den von Dreyer-Ward angegebenen kleinen Spitzgläsern. Der Unterschied hierbei ist also augenscheinlich lediglich auf die verschiedene Form der Ablesung zurückzuführen. Demgegenüber ist es freilich als ein Vorteil der Sigma-Reaktion und ihrer Ablesung mittels des Beleuchtungsapparats von Dreyer-Ward zu betrachten, dass zweifelhafte Flockungen ohne weiteres übersehen werden. Es dürfte also auch in Bezug auf die Ablesung der Ergebnisse

und die Verwendung der Röhrchen nur von der Beschaffenheit und der Einstellung des Extrakts abhängen, ob die eine oder andere Methode den Vorzug verdient. So ist es ohne weiteres zu verstehen, dass die Sachs-Georgi-Reaktion beim Ansetzen in den engen Spitzröhrchen von Dreyer-Ward fast stets schwächer ausfiel, als in den gewöhnlichen Reagenzgläsern. Dass aber dieser schwächere Grad des Ausfalls gewissermassen nur eine optische Täuschung war, ergab sich daraus, dass nach Umfüllen der engen Spitzröhrchen in gewöhnliche Reagenzgläser und Beurteilung im Kuhn-Woitheschen Agglutinoskop die Unterschiede, wofern sie vorhanden waren, schwanden.

8. *Bedeutung der quantitativen Verhältnisse.* — Es ist schon erwähnt worden, dass die Serumabstufungen bei der Sigma-Reaktion nicht von wesentlicher Bedeutung erscheinen. Im allgemeinen reichten mittlere Serumdosen von 5-2 Tropfen aus. Bei der Sachs-Georgi-Reaktion scheint gleichfalls die verwandte Serummenge ein Optimum darzustellen. Wenn auch nicht ohne weiteres bestritten werden kann, dass durch Verwendung von weiteren Serumdosen in seltenen Fällen die positiven Ergebnisse sehr geringgradig vermehrt werden könnten, so dürfte es sich in praktischer Hinsicht doch um solche Ausnahmen handeln, dass der Mehraufwand an Zeit und Material nicht lohnend erscheint.

Im vorigen Abschnitt ist schon erwähnt worden, dass die Ausführung der Sachs-Georgi-Reaktion in kleinen Spitzröhrchen und ihre Ablesung im Beleuchtungsapparat von Dreyer-Ward eine Abschwächung ergibt. Von dem Gedanken ausgehend, dass diese Differenz gegenüber der Sigma-Reaktion durch die Serumkonzentration bedingt sein könnte, haben wir die Ausführung der Sachs-Georgi-Reaktion in kleinen Spitzröhrchen derart variiert, dass wir nach Möglichkeit die quantitativen Bedingungen der Sigma-Reaktion nachahmten. Wir haben zu diesem Zwecke je 0,2 cc unverdünntes Serum mit je 0,5 cc 6facher, zweizeitig hergestellter Extraktverdünnung gemischt. Das Verhältnis zwischen Serum und Extrakt entspricht hierbei durchaus der Anordnung von Sachs-Georgi, der Unterschied ist nur darin gelegen, dass die Serumverdünnung wegfällt. Bei dieser Anordnung ergab sich nunmehr eine Verstärkung der Reaktion bei Ablesung im

Dreyer-Wardschen Beleuchtungsapparat gegenüber der gewöhnlichen Ansetzung der Sachs-Georgi-Reaktion in Dreyer-Ward-Röhrchen, so dass die Ergebnisse der Sachs-Georgi-Reaktion in gewöhnlichen Reagenzgläsern gleichkamen. Man darf daraus schliessen, dass für die beiden Formen der Ablesung die Konzentrationsverhältnisse nicht gleichgültig sind, und es wird vielleicht von Interesse sein, in dieser Hinsicht weitere vergleichende Untersuchungen auszuführen.

Zusammenfassend hat sich ein weitgehender Parallelismus der Wassermannreaktion mit den Flockungsmethoden mit cholesterinierten Extrakten ergeben. Die Meinickesche 3. Modifikation steht an Empfindlichkeit etwas nach, für die neue Meinickesche Trübungsreaktion mit aktivem Serum dürfte weitere Erprobung erforderlich sein. Bemerkenswert ist, dass trotz weitgehender Uebereinstimmung der einzelnen Verfahren doch immer Differenzen bestehen, die mit der einen oder anderen Methode besser reagieren. Die Empfindlichkeit wird also durch gleichzeitige Benutzung mehrerer Verfahren gesteigert.

Was insbesondere die Ausflockung mit cholesterinierten Extrakten anlangt, so dürfte die Sigma-Reaktion, die amerikanische Methode von Kahn und die Sachs-Georgi-Reaktion wesensgleich sein. Man kann im allgemeinen die Extrakte von Dreyer-Ward und von Sachs-Georgi gegenseitig unter Beibehaltung der übrigen Originalvorschriften ersetzen. Für eventuelle weitere Untersuchungen würde es also ratsam sein:

1. Die verschiedenartigen Extrakte vergleichend unter Beibehaltung der übrigen Anordnung zu prüfen.
2. Wofern besonderer Wert auf die Ablesung mittels des Dreyer-Wardschen Beleuchtungsapparates gelegt wird, die Sachs-Georgi-Reaktion in kleinen Spitzröhrchen in den unter Ziffer 8 angegebenen Mengenverhältnissen auszuführen.
3. Vergleichend zu prüfen, ob sich bei der Sachs-Georgi-Reaktion bei der Ausführung im Wasserbade anstatt im Brutschrank ein wesentlicher Vorteil ergibt; jedoch

dürfte die Verstärkung durch den Aufenthalt im Wasserbad nicht von grosser Bedeutung sein.

Nach alledem dürfte, wenn man von der besseren oder schlechteren Eignung der Extrakte absieht, das Arbeiten nach den Angaben von Dreyer-Ward oder von Sachs-Georgi mehr eine Frage der Gewohnheit des Untersuchers und der Laboratoriumseinrichtung sein. Zu entscheiden bleibt im wesentlichen die Frage, ob für die Ausflockung mit cholesterinierten Extrakten die von Dreyer-Ward benutzte Extraktion nach Bordet-Roulans einen Vorteil bedeutet, und ob die Ausflokkung im Wasserbade bessere Ergebnisse zeitigt, als diejenige im Brutschrank.

ANNEXE II.

ANNEX II.

Communications par

Communications by

1. Dr Th. Madsen: *Results of Quantitative Sigma-Test.*
2. Dr E. Renaux: *L'antigène de l'Institut Pasteur de Bruxelles (antigène Bordet-Ruelens) pour le diagnostic de la syphilis par la réaction de fixation et par la Sigma-réaction.*
3. Dr E. Wyler: *Note on Some Investigations carried out after the close of the Conference.*
4. Professor Rudolf Müller: *Demonstrationen während der Kopenhagener Konferenz. Nach Arbeiten von R. Müller, in Gemeinschaft mit R. Brandt und E. Kunewälder.*

5. (*a*) Cas Tableau 2, N° 418.
   (*b*) Case Table 2, No. 418.
6. (*a*) Note du Dr Mutermilch.
   (*b*) Note by Dr. Mutermilch.

1.

RESULTS OF QUANTITATIVE SIGMA-TEST.

By Th. Madsen.

As is seen from our report, satisfactory results have been obtained at this Institute with the Sigma Test. So far as sensitiveness is concerned, it is better than the B.W. test as hitherto carried out here. It should, however, be remarked that our B.W. test is rather on the weak side: we have always laid great stress on the avoidance, as far as possible, of unspecific results. Nevertheless, it has been our intention for some time past to use a more sensitive method, but we thought it desirable to avoid making any change prior to the Conference.

The following figures show the extent to which uniform readings can be obtained in the Σ test by the same observer (Assistant MOERCH).

Date	Σ Units	Date	Σ Units	Date	Σ Units
25. IX.	450	9. X.	175	16. X.	50
2. X.	325	20. X.	40	25. X.	45
20. X.	25	27. X.	40	30. X.	14
27. X.	7	3. XI.	25	5. XI.	12
3. XI.	7	10. XI.	8	13. XI.	12
10. XI.	7			19. XI.	3
17. XI.	2				
29. IX.	25	25. IX.	30	2. X.	130
2. X.	4	2. X.	15	15. X.	25
15. X.	3	9. X.	8	20. X.	12
20. X.	2.5	16. X.	2.5	27. X.	7
		23. X.	2		
8. X.	130				
15. X.	50				
22. X.	50				
27. X.	20				
3. XI.	20				
10. XI.	8				

These examples illustrate the changes in the reaction in the same patient on different days. The observer had no knowledge of the source of the specimens examined. It is obvious that in this way the Σ method can give excellent results.

As to the question of the practical importance of such a quantitative method, I am inclined to think that, at the present time, indication of the results by hieroglyphics such as are used at this Conference in reporting the result of the serological tests is more useful for the general practitioner than indication by units. Until the leading institutes can agree upon a unit system which is easy of standardisation and can be relied upon to yield uniform results in all laboratories, the adoption of a unit system which does not fulfil these conditions would be more likely to produce confusion than to be of any advantage. How difficult it is to obtain agreement in Σ readings is clearly shown in the comparative tests made prior to the Conference (Table 1). When it is remembered that skilled workers have failed to achieve uniform results despite prolonged efforts to this end the great delicacy of the method can be realised.

The few figures from Assistant Moerch's tests which I have just shown you demonstrate on the other hand how satisfactory results can be obtained by the *same* observer.

2.

L'ANTIGÈNE DE L'INSTITUT PASTEUR DE BRUXELLES (ANTIGÈNE BORDET-RUELENS) POUR LE DIAGNOSTIC DE LA SYPHILIS PAR LA RÉACTION DE FIXATION ET PAR LA SIGMARÉACTION.

Par Ernest Renaux.

Dans le travail où ils présentent leur antigène, Bordet et Ruelens donnent comme mode de préparation la technique suivante: à 100 gr. de cœur de veau frais et finement haché, on ajoute 125 cc. d'alcool 95 %. On laisse en contact pendant 2 à 3 jours, on filtre sur papier pour éliminer l'alcool qui a pour seul but de coaguler les albumines et qui, dilué immédiatement par le suc du tissu, n'exerce qu'une action extractive peu intense. Après dessication du hachis à 37°, on y ajoute 200 cc. d'acétone. On laisse à la température de la chambre pendant 8 à 10 jours en agitant 2 fois par jour, puis on rejette l'acétone chargée des lipoïdes extraits et on la remplace par une nouvelle quantité d'acétone fraîche qu'on laisse agir pendant 2 à 3 jours. On filtre, on laisse dessécher à la température de la chambre la viande *épuisée* par l'acétone, puis on y ajoute 200 cc. d'alcool 95 % qu'on laisse agir 10 à 12 jours à la température du laboratoire en agitant 2 à 3 fois par jour. En filtrant sur papier, on obtient alors une solution de lipoïdes de coloration jaune clair qui constitue l'antigène brut.

Nous avons modifié la préparation de l'extrait en supprimant le premier contact à l'alcool et en coagulant directement par l'acétone les albumines du tissu cardiaque. Nous renforçons d'autre part l'épuisement par l'acétone, de sorte que les divers temps de la préparation peuvent s'indiquer comme suit :

1. 100 gr. cœur de veau finement haché + 125 cc. acétone. Contact 24 heures en agitant 2 à 3 fois dans la journée. Eliminer l'acétone par filtration sur papier;

2. Ajouter au hachis 200 cc. d'acétone. Laisser à la température du laboratoire 6 à 8 jours en agitant 2 ou 3 fois par jour;
3. Répéter une deuxième fois cette opération et, éventuellement, une troisième fois si l'acétone, après avoir agi pendant 5 à 6 jours, filtre encore colorée. Dessécher à la température de la chambre le tissu soigneusement égoutté;
4. Extraction à l'alcool 95 % comme la technique primitive.

Pour la réaction de Bordet-Wassermann, l'extrait est préparé comme suit: 1 cc. d'extrait est évaporé dans un verre de montre à 37°; on reprend par 3 cc. d'eau distillée, puis par 27 cc. d'eau physiologique (NaCl à 0,9 %) et on utilise 0,16 cc. pour 0,05 et 0,1 cc. de sérum du malade.

Dreyer et Ward ont adopté pour la Sigmaréaction l'antigène Bordet-Ruelens tel qu'il est décrit au début de cette note. Ils y ajoutent une certaine quantité de cholestérine dissoute dans l'alcool absolu.

Cette addition constitue, à notre avis, un inconvénient, car, si elle est sans danger lorsqu'on peut se procurer de la cholestérine pure Kahlbaum, elle devient délicate lorsqu'on a recours à des cholestérines d'autres marques. Les résultats sont alors irréguliers et nous avons pensé qu'il serait intéressant de supprimer, si possible, l'ajoute de ce produit. Nous avons éprouvé à cette fin notre nouvel antigène dilué goutte à goutte par l'eau physiologique suivant la technique de Dreyer et Ward.

Nous préparons de cette façon un antigène *a*) et un antigène *b*), mais avec une dose d'extrait supérieure à celle recommandée par D. et W. On prendra 1,5 cc. ou 2 cc. d'extrait brut pour 11 et 34 cc. d'eau physiologique.

La Sigmaréaction pratiquée dans ces conditions donne des résultats à peu près identiques à ceux que l'on obtient en employant l'antigène cholestériné des auteurs britanniques. L'intensité de la floculation est parfois un peu moins marquée dans les réactions très fortes. Elle est, au contraire, souvent renforcée dans les réactions faibles.

Nos essais, portant actuellement sur plus de 400 cas, nous

ont paru nettement favorables. Ils présentent d'ailleurs pour la lecture de la Sigmaréaction un avantage appréciable, en ce que l'on observe beaucoup moins qu'avec l'antigène cholestériné les troubles opaques qui rendent parfois très laborieuse la recherche de la floculation.

3.

NOTE ON SOME INVESTIGATIONS CARRIED OUT AFTER THE CLOSE OF THE CONFERENCE.

By E. J. Wyler.

At Dr. Madsen's invitation I remained in Copenhagen for about two weeks after the conclusion of the Conference to assist in trying to elucidate some problems that had arisen during its course.

The chief of these were (1) the apparently unaccountable and unexpected weakness shown by the flocculation tests, but more particularly by the Sigma-reaction, (2) the occurrence of apparently unspecific results in the case of some of the investigators in the B.W. test as well as in the flocculations.

While it was, of course, scarcely possible to arrive at any definite conclusions without prolonged investigation, the ground was cleared to a certain extent and some valuable data gained as the basis for further investigation. It is not proposed here to give a detailed account of this supplementary enquiry, but it may be of interest to give a brief summary of the results obtained with certain of the sera which it was considered desirable to retest. These are set out in Table 3 of the report.

Thirty-nine fresh specimens of serum and two cerebrospinal fluids were retested by B.W. and Sigma on five test-days. The B.W. was carried out by me as during the Conference according to Method 1, Medical Research Council, Report No. 14. The Sigma was performed, in essential details, as nearly as possible according to the strict *Dreyer-Ward* technique used by me in London since the commencement of the present enquiry. The same extracts and cholesterin were used as at the Conference. The outstanding feature of Table 3 is the preponderance of positive results in cases of syphilis obtained by the B.W. over the Sigma test. This is entirely at variance with the previous experience of

the investigators in their own laboratories, but confirms their results in Copenhagen. It shows that the relative failure of the Sigma test was no mere coincidence due to some undetected condition present at the Conference.

In addition to the retests in Table 3, 34 sera which had not been submitted to the Conference were tested by me in parallel by B.W. and Sigma. The same contrast was obtained between the results in these cases as between the tests of the Conference sera.

4.

DEMONSTRATIONEN WÄHREND DER KOPENHAGENER KONFERENZ.

Nach Arbeiten von R. Müller in Gemeinschaft mit R. Brandt und E. Kunewälder.

Die wichtigsten Faktoren die bei der Bereitung von Extrakten für die Anstellung von lipaffinen Reaktionen zum Luesnachweis und zwar sowohl für die Komplementbindungs- als auch für die Flockungsmethoden in Betracht kommen sind: die Wahl des Ausgangsmaterials, die Art der Vorbehandlung dieses Materials, die Art der Zusätze zur Verstärkung der Wirksamkeit und schliesslich die Verdünnungsmethodik, durch welche eine bestimmte Dispersität von optimaler Wirkungsstärke und entsprechender Spezifität garantiert wird. Die hier demonstrierten Versuche befassen sich nur mit dem letzteren Punkt.

Schon von *Sachs* und seinen Mitarbeitern wurde darauf hingewiesen, wie wichtig es ist, eine bestimmte Geschwindigkeit bei Verdünnung eines alkoholischen Stammextraktes mit Salzlösung einzuhalten. Verdünnt man langsam, so bekommt man dichtere und meist viel wirksamere Extrakte als bei rascher Verdünnung. Es sollen hier Versuche demonstriert werden, die dieses Verhalten zu erklären geeignet erscheinen.

1. *Demonstration.* — Verdünnt man alkoholischen Lipoidextrakt mit Wasser in ansteigender Menge, so wird bei einem bestimmten Mengenverhältnis von Alkohol und Wasser die stärkste Trübung entstehen. Im demonstrierten Versuch ist eine solche Reihe mit Meinicke-Antigen angestellt worden. Zu je 1 ccm. Meinicke-Extrakt werden ansteigende Mengen von Wasser (0,3-3,0) zugesetzt. In den Röhrchen, denen 0,5-0,6 Wasser zugesetzt wird, zeigt sich die dichteste Trübung, links davon, also mit 0,3-0,4 Wasser, ist die Extrakt-

mischung durchsichtiger und zeigt zarte Eigenflockung, rechts vor Optimum, also von 0,7 an, wird die Mischung zunehmend klarer und kolloidal durchscheinend. Andere kolloidale Substanzen haben ein anderes Optimum. Es wird z.B. die gleiche Reihe mit alkoholischer Mastixlösung demonstriert, wobei sich als Optimum das Alkohol-Wasser-Verhältnis von 1 : 1 ergibt.

2. *Demonstration.* — Setzt man zu einem Röhrchen mit relativem Wasserüberschuss, also z.B. zum Röhrchen mit 1 ccm Extrakt und 2 ccm Wasser, Alkohol zu, so wird die Extraktmischung trüber und beginnt bei genügendem Alkoholzusatz schliesslich zu präzipitieren. Dieser Moment wird dann erreicht, wenn sich im Ganzen mehr als doppelt so viel Alkohol als Wasser im Röhrchen befindet (ebenso also, wie bei der ersten demonstrierten Reihe in dem Röhrchen mit 1 ccm alkoholischen Extrakte und 0,3-0,4 Wasser). Es zeigt sich also, dass der Alkohol, dieses gute Mittel für kristalloide Lösung, unter Umständen förmlich als *Fällungsmittel* bei kolloidaler Mischung wirkt. Wir erklären uns diese Tatsache durch die Eigenschaft des Alkohols die Oberflächenspannung herabzusetzen.

3. *Demonstration.* — Die sub 1 und 2 demonstrierten Versuche sind wohl imstande, die stärkere Trübung bei langsam bereiteter Extraktverdünnung zu erklären. Es wird nun bei dieser dritten Demonstration eine solche Extraktverdünnung 1 : 3 ganz langsam, tropfenweise, vorgenommen. Man sieht deutlich, dass im selben Moment die stärkste Trübung eintritt, wo die Gesamtmenge der zugesetzten Tropfen ungefähr der halben Alkoholmenge des zu verdünnenden Stammextraktes entspricht. Die weiterhin zugesetzten Tropfen hellen zwar die Mischung entsprechend der Konzentrationsverminderung auf, doch resultiert immer noch eine dicht kolloidale Dispersion. Es wird ferner gezeigt, dass diese zweite Hälfte der Verdünnung, also nach Eintritt der stärksten Trübung, auch rasch, in einem Guss, geschehen kann, ohne dass im schliesslichen Aussehen der Extraktmischung ein wesentlicher Unterschied zu bemerken wäre. Sodann wird eine rasche Verdünnungsart demonstriert, bei der die 3 ccm Wasser zu 1 ccm Extrakt mittelst Pipette *geblasen* werden. Auf diese Weise entsteht

ein ganz heller kolloidaler Extrakt. Es ist eben jener kritische Punkt, dessen Einhaltung notwendig ist, um möglichst dichte Extraktmischung zu erhalten, förmlich übersprungen worden. Solche helle Extrakte sind praktisch meist viel weniger wirksam. Es wird schliesslich gezeigt, dass bei umgekehrter Versuchsanordnung, wenn man nämlich den alkoholischen Extrakt zu vorbereiteten 3 ccm Wasser gibt, kein so wesentlicher Unterschied besteht, ob dieser Zusatz rasch oder langsam erfolgt. Da nämlich in diesem Fall ein Ueberschuss von Wasser in dem Röhrchen bereits vorhanden ist, kann weder bei raschem noch bei tropfenweise erfolgendem Zusatz des alkoholischen Extrakts jenes Optimum erreicht werden, zu dessen Zustandekommen ein bestimmter Ueberschuss von Alkohol nötig ist.

4. *Demonstration.* — Wenn man die Mischung nicht mit Wasser sondern mit Salzlösung vornimmt, wird wohl prinzipiell an der Tatsache nichts geändert, dass zur Erlangung eines möglichst dichten Extraktes das ungefähre Verhältnis von 1 Alkohol zu 0,5 Wasser nötig ist. Die so entstandene sehr dichte Trübung neigt aber infolge des Salzgehaltes zu sehr rascher Präzipitation, so dass die entstehenden Mischungen trotz weiterer Verdünnung praktisch unbrauchbar sein können. Eine solche Neigung zur Präzipitation bei Verdünnung im Optimum wird durch Cholesterinzusatz noch erhöht. Wir fanden nun, dass durch vorherige Erhitzung des alkoholischen Extraktes eine solche praktisch wichtige *Verdünnung im Optimum* selbst bei cholesterinisiertem Extrakt möglich wird, wobei das entstehende Gemisch nach weiterer Verdünnung mit Salzlösung dauernd in kolloidalem Zustand bleibt, ohne zu präzipitieren. Auf diese Weise sind Extrakte mit optimaler Wirksamkeit zu erhalten. Wir gebrauchen solche Extrakte sowohl für die Flockungsreaktionen als auch für die WaR. Hier soll unsere Extraktbereitung für die WaR. demonstriert werden. In eine breite Eprouvette kommen 24 ccm cholest. Rinderherzextrakt, die auf 8 ccm eingeengt und dann rasch mit 25 ccm Kochsalzlösung zweiphasig verdünnt werden, wobei die erste Phase ungefähr im Optimum (8 Teile Alkohol zu 5 Teilen Wasser) stattfindet. Das so erhaltene Gemisch wird dann einem Reifungsprozess

bei 56 Grad ausgesetzt, wodurch sich die kolloidale Lösung bis zur Suspension vergröbert. (Die Details sind in diesem Bericht bei der Angabe unserer Wassermann-Technik enthalten). Auf ähnliche Weise stellen wir uns auch ein Extraktgemisch für die Flockungsreaktionen her, nur wird hier die zweite Phase der Verdünnung nicht mit 20, sondern mit 50 ccm. Kochsalz vorgenommen. Der Reifungsprozess entfällt selbstverständlich, da wir ja für die Flockungsreaktionen ein gleichmässig kolloidal gelöstes Antigen benötigen. Mit diesem Antigen erhält man rasch entstehende und starke Flockung bei Lues. Genaue Details bleiben einer späteren Publikation vorbehalten. Es wird ein Flockungsversuch mit diesem Antigen demonstriert. Schon nach einigen Stunden zeigen die Luesfälle deutlich dichte Trübung, zum Teil auch schon makroskopisch sichtbare starke Flockung. Die Nichtluesfälle bleiben klar kolloidal durchscheinend.

5. *Demonstration.*

Zur Schutzwirkung der Seren gegen Flockung.

Es wird gezeigt, dass in jedem Serum, auch in luetischen Seris schützende Wirkung gegen Ausflockung enthalten ist. Bekanntlich ist die Sachs-Georgi-Reaktion bei Verwendung physiologischer Kochsalzlösung nur mit inaktiven Seren brauchbar; mit aktiven versagt sie. Sachs wies nach, dass auch die D.M. mit aktiven Seren dann versagt, wenn statt 2%iger physiologische Kochsalzlösung verwendet wird. Inaktiviert man jedoch die Sera, dann gibt auch bei dieser Versuchsanordnung mit physiologischer Kochsalzlösung die D.M. brauchbare Resultate. *Sachs* und *Georgi* sind der Meinung, dass das Versagen der Sachs-Georgi-Reaktion mit aktiven Seren darauf zurückzuführen ist, dass die Sera eine Schutzwirkung gegen die Flockung ausüben, die nach Inaktivierung schwindet. Ebenso ist diese Schutzwirkung durch erhöhte Kochsalzkonzentration zum Schwinden zu bringen. Daher kann man die Original-Meinicke-Reaktion, die mit 2%iger Kochsalzlösung angestellt wird, auch aktiv ausführen, die Original-Sachs-Georgi-Methode, bei der phys. Kochsalzlösung verwendet wird, nur mit inaktiven Seren.

Es wird an einem Meinickeversuch (D.M.) bei dem statt mit 2% mit physiologischer Kochsalzlösung gearbeitet wird, demonstriert, dass Zusatz von aktiven Serum zu inaktivem ohne diesen Zusatz positiv reagierendem Luesserum die Flockung völlig aufhebt. Es wird ferner gezeigt, dass es gleichgültig ist, ob das zugesetzte aktive Serum ein *Normalserum* oder ein im inaktivem Zustand positiv reagierendes *Luesserum* ist.

5 (a).

CAS TABLEAU 2, N° 418.

Comme le cas suivant a causé des discussions animées, nous joignons ci-dessous son histoire et les résultats de l'examen détaillé exécuté après la Conférence.

Homme de 70 ans; il nie avoir été atteint de la syphilis. Femme saine, pas de fausse couche.

Autrefois le malade a été deux fois à l'hôpital pour rhumatismes. Depuis 1919, il a été 4 fois à l'hôpital.

Première hospitalisation, 14/II. 19. — Bronchite, emphysème pulmonaire « degeneratio cordis », aucun symptôme de syphilis.

B.W. 28/II. 10 *nettement positive* (0.60.100). — Traitement: 3 grammes d'iodure de potassium par jour.

B.W. 30/v. 10 — *négative.*

Deuxième hospitalisation, 28/III. 22 pour cause de purpura hémorragique (rhumatismal); en outre, dyspnée et œdème des jambes. Aucun symptôme de syphilis. Le purpura a disparu après une semaine à la suite d'un traitement symptomatique.

Troisième hospitalisation, 26/v. 22, également pour purpura hémorragique.

Quatrième hospitalisation, 29/VIII. 23. Rétrécissement de l'œsophage et du cardia; symptômes: dysphagie, symptômes de rétrécissement, asthme, battements de cœur, douleurs dans la région du cœur. Symptômes éventuels de syphilis: souffles systoliques à l'aorte. Foie, deux doigts au-dessous de l'arc costal. Réflexes et pupilles normaux; hémoglobine le 15/IX, 83%, pression du sang 120 mm. *Rayons X*: le gruau descend tout au plus jusqu'au cardia; il s'accumule au-dessus, dans l'œsophage atteint d'une dilatation sacciforme.

28/XI. *B.W. Voir tableau* 2, *N°* 418.

6/XII. Injection provocatrice de néosalvarsan.

10/XII. *B.W. etc., voir tableau* 3, *N°* 418.

17/XII. *B.W. etc., voir tableau* 3, *N°* 418.

17/XII. Liquide céphalorachidien: nombre de cellules, 16/3; globuline 0, albumine 10.

B.W. etc., voir tableau 3, *N°* 418.

Poids 31/III. 22: 73,6 kilogs. — 28/IX. 23: 76 kilogs. — 21/XII. 23: 77,3 kilogs.

18/XII. — Examen, aucun amaigrissement.

En auscultant le cœur, on constate aussi bien à la pointe qu'à la base des souffles systoliques. Les réflexes patellaires sont faibles.

5 (b).

CASE TABLE 2, Nº 418.

The following case having given rise to animated discussions, we reproduce below its history and the results of a detailed examination performed and completed after the Conference.

Man, 70 years old: denies suffering from syphilis. Wife healthy, no miscarriages. Patient twice previously in hospital for "rheumatism".

In hospital on four occasions since 1919.

First occasion 14/II. 19. Bronchitis, pulmonary emphysema, degeneration of the heart muscle, no symptoms of syphilis.

B.W. 28/II. 19 = *strongly positive* (0.60.100). Treatment: 3 grammes potassium iodide daily.

B.W. 30/V. 10 = *negative.*

Second occasion 28/III. 22 for *purpura hæmorrhagica (rheumatica)*; in addition dyspnea and œdema of the lower limbs. No symptoms of lues. Purpura disappeared after a week as a result of purely symptomatic treatment.

Third occasion 26/V. 22. Again for *purpura hæmorrhagica.*

Fourth occasion 29/VIII. 23. Stricture of the oesophagus or cardia. Symptoms: dysphagia, symptoms of stricture, shortness of breath, palpitation of the heart, pains in the region of the heart. Possible symptoms of syphilis: feeble systolic murmurs over the aorta. Liver, two finger-breadths under the costal arch. Reflexes and pupils normal. Hæmoglobin on 15/IX 83%; blood pressure 120 mm. *X-rays.* The groats do not go beyond the cardia; they collect over the cardia in the widely dilated oesophagus.

28/XI. — *B.W. See Table* 2, *No.* 418.

6/XII. *Provocative Neosalvarsan-injection.*

10/XII. *B.W. etc. See Table* 3, *No.* 418.

17/XII. *B.W. etc. See Table* 3, *No.* 418.

17/XII. Cerebro-spinal fluid: Number of Cells 16/3, Globulin 0, Alb. 10.

B.W. etc. See Table 3, *No.* 418.

Weight 31/III. 22: 73.6 kilogs., 28/IX. 23: 76 kilogs., 21/XII. 23: 77.3 kilogs.

18/XII. Examination: no emaciation.

Examination of the heart both at the apex and the base: systolic murmurs. Knee-jerks weak.

Pas de cachexie. Malgré de nombreuses analyses, ni sang ni mucus n'ont été trouvés dans les fèces.

Examen par les rayons X. — 14/I. 24: Images compliquées.

Diagnostic: rétrécissement organique du cardia, probablement cancéreux et, en même temps, anévrisme de l'aorte.

1/II. 24: B.W. = +, S.G. = ±, Sigma + (1,6), M.T.R. ++.

4/II. 24. — Depuis le 14/I, deux fois par semaine, une ampoule *a* de 3 grammes de Vijochin et une fois par jour 1 gramme d'iodure de potassium.

No cachexia. Numerous examinations revealed no sign of blood or mucous in the fæces.

X-ray examination 14/I. 24: Complications shown.

Diagnosis: organic stricture of the cardia, cancer probable and at the same time aortic aneurism.

1/II. 24. *B.W.* = +, *S.G.* = ±, *Sigma* + (1.6), M.T.R. ++.

4/II. 24. From 14/I twice weekly 1 ampulla *a* of 3 gr. Vijochin and 1 gr. daily of potassium iodide.

6 (a).

NOTE DU Dr MUTERMILCH.

Le Dr Mutermilch attire l'attention sur l'erreur suivante qui s'est glissée pendant la transcription des résultats du Cahier d'expériences au protocole officiel:

Sérum 182: ± au lieu de +
» 113: 0 » » » ++

6 (b).

NOTE BY Dr MUTERMILCH.

Dr Mutermilch draws our attention to the following mistakes committed in copying the results obtained from his notes into the Official Record:

Serum 182: ± instead of +
„ 113: 0 „ „ ±

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[Distributed to the Council and the Members of the League.]

C. 10. M. 7. 1924. III.

Geneva,
March 20th 1924.

LEAGUE OF NATIONS

HEALTH COMMITTEE

MINUTES OF THE FIRST SESSION

held at Geneva from February 11th to 21st, 1924.

LIST OF MEMBERS OF THE COMMITTEE

Members:

Dr Th. MADSEN, *President*,	Director of the State Serum Institute, Copenhagen.
M. O. VELGHE, *Vice-President*,	Director-General of the Health Department at the Ministry of the Interior and of Health, Brussels.
Sir George BUCHANAN, C.B., M.D., *Vice-President*,	Senior Medical Officer of the Ministry of Health, London.
Professor Léon BERNARD,	Professor of Hygiene at the Faculty of Medicine of the University of Paris.
Dr H. CARRIÈRE,	Director of the Federal Health Department, Berne.
Dr CHODZKO,	Former Polish Minister of Health.
Dr JITTA,	President of the Health Council of the Netherlands, The Hague
Professor Ricardo JORGE	Director-General of Public Health, Lisbon.
M. Shiko KUSAMA (until appointment of Japanese member).	Japanese League of Nations Office, Paris.
Dr A. LUTRARIO,	Director-General of the Health Department at the Ministry of the Interior, Rome.
Dr P. MIMBELA,	Professor at the Faculty of Medicine, Lima.
Dr NOCHT.	Director of the Institute for Tropical Diseases, Hamburg.
Professor Donato OTTOLENGHI,	Professor of Hygiene at the Royal University, Bologna.
Professor Gustavo PITTALUGA,	Catedratico de la Facultad de Medicina, Madrid.
Dr L. RAYNAUD,	Inspecteur général des Services d'hygiène d'Algérie, Algiers.
Dr RAJCHMAN,	The Medical Director, acted as Secretary of the Committee.

Absent:

Dr Carlos CHAGAS,	Director of the Instituto Oswaldo Cruz, Rio de Janeiro.
Surgeon-General H. S. CUMMING, *Vice-President*.	Director-General of the United States Public Health Service, Washington.
Dr A. GRANVILLE.	President of the Conseil Sanitaire, maritime et quarantenaire, Alexandria.
Dr Alice HAMILTON.	Associate-Professor of Industrial Hygiene, Harward Medical School, Boston.

S. d. N. 1650 (F.) + 1350 (A.) 3/24. Imp. Kundig.

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FIRST MEETING

Held on Monday, February 11th, 1924, at 3 p.m.

PRESENT: All the members of the Committee, except Dr. Chagas, Surgeon-General Cumming and Dr. Granville.

There were also present: The Medical Director, as Secretary of the Committee, and Dr. Carozzi, Chief of the Section of Industrial Hygiene at the International Labour Office.

The meeting was opened by Sir Eric Drummond, Secretary-General of the League of Nations.

1. Opening Address by the Secretary-General of the League.

The SECRETARY-GENERAL, in the name of the Council of the League, welcomed the members of the Health Committee.

The establishment of the Health Organisation marked great progress in the League's work in connection with questions of international health. He hoped that the provisions which had been framed to prevent overlapping between the work of the League's Health Organisation and that of other international organs functioning in the same general sphere would enable future progress to be particularly rapid.

He asked whether the Committee would proceed to the election of its President.

M. VELGHE asked permission to reply to the Secretary-General on behalf of the Committee.

He thanked the Secretary-General for having been so good as to assist at the inauguration of the Health Committee and assured him that the Committee would do its utmost to fulfil the hopes placed in it by the League of Nations. All the members of the Health Committee were conscious of the serious nature of the task entrusted to them, as well as of the great influence which the League of Nations could exert in the realisation of the conclusions reached by the Committee in the course of its work for the improvement of the conditions of life and the health of the peoples. The Committee was therefore happy to assist the League of Nations in advancing the progress of international health.

2. Election of the President.

M. VELGHE believed that the Committee could not do better than unanimously agree to the election of the learned Dr. Madsen, whose name, even before he had been appointed a member of the Health Committee, was already on the lips of everyone. This was only right, as he had fulfilled his duties as Chairman of the Provisional Health Committee of the League of Nations to the satisfaction of all. The great qualities which he had shown in the exercise of his duties could not but oblige his colleagues to ask him to be so good as to continue those duties.

The SECRETARY-GENERAL said that M. Velghe had proposed that Dr. Madsen should be appointed President of the Committee. The applause of the Committee showed that it unanimously approved this suggestion. He therefore proposed that Dr. Madsen should take the chair.

Dr. MADSEN said that he was extremely touched by the tribute which M. Velghe had just paid him, and by the assurance afforded him of the sympathy of his colleagues. He hesitated for various reasons to accept the great honour which had been offered to him.

First, there were personal reasons. A laboratory specialist, even though he dealt actively with epidemiological questions in his own country, found it a heavy task to deal with all the questions falling within the sphere of the Health Committee of the League of Nations. It was impossible to concentrate attention, at the same time, on scientific questions and practical problems. Moreover, the difficulties experienced by one who was obliged to express himself in a foreign language were particularly felt in correspondence work.

Apart from these personal difficulties, there were difficulties which were inseparable from the duties of the President of the Committee. He was not referring to the work of presiding over the meetings themselves. Such work had always been easy, thanks to the friendly help which he had received from his colleagues, who had all become, he might venture to say, his personal friends, and whom he begged to continue that friendship in the future. The task of the President was very heavy, owing to the fact that the work of the Committee was constantly increasing and its field of action extending gradually to all countries. The President thus incurred a great responsibility.

Even if the work of the technical sub-committees was able to replace some of the work of the plenary committee, it was not less necessary for the President to keep himself familiar with the development of the work of the sub-committees unless he were to fail in his duty.

For this reason, he hesitated to assume this great responsibility. In view, however, of the friendly words of M. Velghe during the last meeting of the Permanent Committee of the Office international d'hygiène publique and of the friendly words which he had just pronounced and of the way in which they had been received by the Committee, he thought he might venture for a while to accept the great honour which was offered him. He thanked the Committee cordially for this mark of confidence.

In conclusion, he desired to associate himself with the words of thanks addressed by M. Velghe to the Secretary-General of the League, whose presence at the beginning of this first session of the Committee showed the interest which the League of Nations took in the work of the Committee.

Dr. Madsen thereupon took the chair.

3. Agenda of the Session.

On the proposal of the PRESIDENT, *the agenda was adopted, subject to any possible modifications in the order of the questions to be studied* (Annex 1).

4. Tribute to the Special Mixed Committee and to its Chairman, Dr. Granville.

The PRESIDENT thought that the Committee should begin its work by paying a tribute to the Special Mixed Committee, for it was thanks to this Committee that the Health Committee was now constituted. The scheme of the Special Mixed Committee, which had been composed of delegates of the Permanent Committee of the Office international d'hygiène publique and the Provisional Health Committee of the League, had been unanimously adopted by the Council and the Assembly of the League of Nations; both of these organisations had warmly congratulated the Special Mixed Committee on its work. The Health Committee would certainly wish to thank, in particular, their colleague Dr. Granville, Chairman of the Special Mixed Committee, who was unhappily absent. Dr. Granville had left Alexandria to come to Geneva but had been compelled to interrupt his journey for reasons of health. He was at present resting at Genoa and had sent a message expressing his regret at not being able to assist at the opening of the session; he had added that if his health permitted he would come to Geneva before the session closed.

The President was requested by the Committee to send to Dr. Granville the best wishes of his colleagues for a prompt recovery.[1]

5. Absence of Dr. Chagas and Surgeon-General Cumming.

The PRESIDENT expressed his regret that the two American members of the Committee, Dr. Chagas and Surgeon-General Cumming, had not been able to take part in the work of this session; he was happy to note that the American Continent was, however, represented by Professor Mimbela.

6. Election of the Vice-Presidents.

Professor Léon BERNARD said that, in proposing Dr. Madsen as President of the Committee, M. Velghe had interpreted the wishes of all his colleagues, and no one could with more authority have made this proposal. He was convinced that he was also representing the feeling of the whole Committee in thanking Dr. Madsen for having consented to accept the presidency of the Committee. His colleagues realised that it was a heavy task and that Dr. Madsen was making a real sacrifice. There was no doubt that, in preventing their President, in a certain measure, from pursuing his usual activities, the members of the Committee had assumed a responsibility; they could, however, assume this responsibility with a light heart, seeing that they were thus rendering a great service to science and to humanity.

In order to meet to some extent the anxiety expressed by the President, the Committee might perhaps propose to him that the burdens of his responsibility could be diminished somewhat by the assistance of Vice-Presidents.

The Provisional Health Committee had possessed a Vice-Chairman, to whom it would be unjust not to render a tribute also. He was referring to Sir George Buchanan, whose collaboration had been very valuable to all the members of the Provisional Health Committee, and, in particular, to Dr. Madsen.

The Provisional Health Committee had now given place to an organisation which was at the same time more complete and more stable. It would therefore be well to institute in the Health Committee what existed in all organisations of any real importance and to place beside the President a number of Vice-Presidents to assist him. He suggested that three Vice-Presidents should be appointed.

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[1] The following telegram was sent by the President of the Committee to Dr. Granville: "Health Committee expresses deep regret your illness and transmits wishes early recovery".

In order that no personal questions might arise, he made the following proposal:

One of the Vice-Presidents was indicated *ex officio*, namely: the Chairman of the Advisory Health Council. It was indeed essential that there should be between this Council and the Health Committee of the League of Nations a solidarity and a co-operation of which proof should be given in all parts of the Health Organisation. In order to render the collaboration between the two bodies still closer, the Chairman of the Advisory Council would *ex officio* be a Vice-President of the Health Committee.

The two other Vice-Presidents might, on the contrary, be appointed for one year only, and would not be re-eligible, so that the Committee might establish a system of rotation whereby each of its members would, in turn, perform the duties of Vice-President.

Such was the proposal which he desired to put forward in principle, being careful in so doing to avoid the introduction of any particular name.

M. VELGHE did not quite know whether he ought to be flattered or the reverse by the first proposal which had just been made by Professor Léon Bernard, for he could not be unaware of the work and responsibility attendant upon it. He was in any case very sensible of the fact that this proposal came from Professor Léon Bernard, for he might regard it as an expression of affection towards himself personally.

The proposal before the Committee was that the Chairman of the Advisory Health Council should be *ex officio* a Vice-President of the Health Committee. He therefore would have no choice but to accept this duty if the proposal before the Committee were adopted.

He thought that the second proposal of Professor Léon Bernard was extremely well advised. The system of rotation proposed for two of the Vice-Presidents would enable all the members of the Committee to become familiar with the difficulties of the President. Each would thus be able to see matters from another point of view, namely: that of the presiding officers of the Committee. Moreover, the influence of all the members within the bureau of the Committee itself would thus be assured.

For these reasons, he supported the proposal of Professor Léon Bernard.

Sir George BUCHANAN thanked Professor Léon Bernard for the kind references he had made to such assistance as he had been able to give to the Provisional Health Committee and supported warmly the proposal that there should be three Vice-Presidents. He thought this was an admirable suggestion, and, if it would assist the Committee in applying the principle of rotation to regard him as having already served his turn, he would only be too happy to regard himself as in that position.

The Committee approved the proposal of Professor Léon Bernard for the nomination of three Vice-Presidents.

Professor Léon BERNARD said that he had not had any intention of speaking again on the subject, but the last words of Sir George Buchanan obliged him to do so. If he were permitted immediately to put forward names, he thought that agreement would easily be reached.

M. Velghe was appointed *ex officio* Vice-President of the Committee. As to the other Vice-Presidents, one of them was also clearly indicated, because it was impossible not to reappoint Sir George Buchanan. Omission to do so would amount to a kind of reproach, which it was far from the intention of the Committee to make. Sir George Buchanan must accordingly be appointed a Vice-President of the Committee.

As for the third, Professor Léon Bernard could express himself with all the more freedom as the member to whom he referred was not present. In appointing Surgeon-General Cumming, the Committee would not only gladly pay a tribute to the United States and to the ideal which that great country represented but would also bear witness to the gratitude which the Health Organisation of the League of Nations owed to a great American Institution, namely: the Rockefeller Foundation.

Professor Léon Bernard therefore wished to propose the names of M. Velghe, Sir George Buchanan, and Surgeon-General Cumming as Vice-Presidents of the Committee.

This proposal was unanimously adopted.

M. VELGHE said that he looked upon this duty rather more as a task than as an honour, but he warmly thanked his colleagues and assured them of his full collaboration.

Sir George BUCHANAN thanked his colleagues and accepted his appointment.

7. Appointment of the Four Additional Members of the Committee.

The PRESIDENT reminded the Committee that the scheme of the Special Mixed Committee contemplated the appointment by the Health Committee of four other members described by the Mixed Committee as assessors.

The Council of the League, at its last session, in December 1923, after having appointed the six members which it had to nominate, had also unanimously decided to invite the Health Committee to consider, as additional members, Dr. Chodzko and Dr. Nocht, who had been members of the Provisional Health Committee. The President desired to associate himself with this proposal.

The Health Committee must, it seemed, at the same time, take into consideration the recommendation made by the Assembly on September 23rd, 1921. This recommendation was as follows:

> "In view of the increasing importance of questions of health which more especially concern women, the Assembly invites the Council to take into consideration, at an

opportune moment, the question of strengthening the Committee, by including a medical woman, experienced in public health matters, qualified to advise on such questions."

The Council, in accordance with this recommendation, had invited Dr. Josephine Baker (United States) to sit on the Provisional Health Committee. Unfortunately, Dr. Baker had been unable to be present at the meetings of the Committee and had resigned for reasons of health.

The President proposed the nomination of Dr. Alice Hamilton, Associate-Professor of Industrial Health at the University of Harvard. Dr. Hamilton was already a member of the Industrial Health Committee of the International Labour Office, and the Director of the International Labour Office warmly recommended her.

Collaboration between the International Labour Office and the Health Organisation would continue to be assured by Dr. Carozzi, Chief of the Section of Industrial Hygiene at the International Labour Office, who had represented that body on the Provisional Health Committee. In accordance with arrangements made with the International Labour Office, Dr. Carozzi would be present at the discussion of any questions of interest to the International Labour Office and would afford the Committee the benefit of his collaboration.

Finally, the Committee would remember that the League of Red Cross Societies had been represented on the Provisional Health Committee. The International Committee of the Red Cross, whose seat was at Geneva, had also asked to be represented on the Health Committee. No solution had as yet been reached by the two Red Cross organisations.

The President proposed that the appointment to the fourth vacant place should be adjourned and that the first three places should be filled by Dr. Chodzko, Dr. Nocht and Dr. Alice Hamilton.

Sir George BUCHANAN made the following declaration:

"All the three names suggested to us have strong claims; two have very strong claims as valued colleagues on the Provisional Health Committee, and, for myself, I am prepared to support their nomination to the Council. I must confess that I feel a little difficulty when I consider other claims, and the importance of a good judgment now to the future of our organisation. Though we are nominated in our personal capacity, according to the Statute, it is evident, in fact, that the representation of individual countries and, above all, the representation of the official public health organisations of the different countries, have been dominant considerations in the nominations made by the Office international d'hygiène publique and by the Council. This seems to me right, since the League of Nations represents a league of Governments, and since in health, as in other matters, its work depends on government action and must be governed largely by the views of the central health departments of the countries concerned.

"On this basis, however, I cannot but regret that in a committee of sixteen, shortly to become twenty, no place whatever has been found for a representative of any of the great self-governing Dominions of the British Empire — Canada, Australia, New Zealand, South Africa — nor for the great country of British India. All these are nations in the League of Nations, on equality with Great Britain and other Members of the League. They contain some 500 million people, no less concerned than other nations with international measures for promoting health and improving public health administration. Those who know the public health services of these countries at all must know how much they have done in medical science and, above all, in practical and successful measures to combat diseases. No one in this room, I think, would question that we have much to learn from them, and that if we profess to consider world questions we ought to secure their aid.

"I would remind you that this consideration was not lost sight of by the Committee of the Office international d'hygiène publique in making the nominations to the four places in respect of which it had unrestricted choice. It was understood that, while no delegate from the British Empire countries, or from the great French Colonies (to which similar considerations apply) were candidates for these four places, the Chairman of the Provisional Health Committee, in the exercise of his right, would advise the Council to include a British Empire member and a member of the French colonial service. It is not easy, by reason of distance, to secure men actually in the service of their own countries. Dominion and colonial representation has to be secured by finding men who are in Europe, but who retain the closest connection with the particular Dominion or Colony to which they formerly belonged. Two such men — admirable names — were available. Furthermore, as regards the British Empire countries, it was explained that a rotation system could be adopted, one Dominion being followed by India, then by another Dominion and so forth.

"I wish to thank the President for having so faithfully and loyally presented these two names to the Council among the six names recommended by him. I can only regret that the Council decided to pass them by. I feel that the Committee has thereby been weakened and is open to the objection that it represents too great a preponderance of public health administrations from European States. I trust that in filling the remaining vacancy and as future opportunities, may offer, the Council will be able to give further consideration to the omissions I have ventured to point out; while supporting your proposal, I would ask leave that these observations may be recorded in the Minutes."

M. VELGHE confirmed what Sir George Buchanan had said regarding the election of the members of the Committee by the Committee of the Office international d'hygiène publique. Sir George Buchanan had also reminded the Committee of the efforts made, at the time of the election, for the representation of the Dominions on the Committee.

The proposals of Sir George Buchanan had been very favourably received by a large number of the members of the Committee of the Office international d'hygiène publique. But Sir George

Buchanan had not insisted on the matter, owing to the difficulties with which the Office international was confronted.

Everyone knew how the choice of the members was rendered difficult by the fact that, of the ten members to be appointed, one was appointed *ex officio* and the choice of four or even five of the others was outlined and limited by the agreement concluded between the Office international d'hygiène publique and the League of Nations.

M. Velghe did not know what had passed in the Council, but the same difficulties must also have arisen in regard to the nomination of the six members which the Council had to appoint. This doubtless explained the reason why the Council had formulated the recommendation which the President had just mentioned in regard to the appointments of Dr. Chodzko and Dr. Nocht, who were members of the Provisional Health Committee but whom the Council was not in a position itself to appoint.

The same difficulties now arose in regard to the four members whom the Committee was to nominate. First, how was it possible to avoid reappointing the two members who formed part of the Provisional Health Committee and who were recommended by the Council ? There remained only two places. In regard to one of them, the Committee was faced with a recommendation of the Assembly. In regard to the second, to which Sir George Buchanan clung with a persistence which deserved the admiration of the Committee, the situation was as follows: there was a request from the League of Red Cross Societies and another from the International Committee of the Red Cross. Negotiations between these two organisations were proceeding with a view to making a joint recommendation of a single member to the Committee. The Health Committee, as far as possible, must help to bring together these two organisations, which had recently made such considerable progress in the direction of collaboration.

The Committee was now in a difficult position. The presence of a representative of the organisa ions of the Red Cross on the Committee seemed to be very desirable, and the Committee could to-day do no more than assure Sir George Buchanan that it would be happy to take advantage of the opportunity which might shortly occur to carry out his proposal for a representation of the Dominions. This proposal deserved to be taken into consideration and was entirely justified.

The PRESIDENT hoped that the declaration which had just been made by M. Velghe would satisfy Sir George Buchanan.

The Committee decided to recommend to the Council the appointment of Dr. Chodzko, Dr. Nocht and Dr. Alice Hamilton as additional members of the Health Committee.

Professor Léon BERNARD said he understood that the Committee had decided to adjourn consideration of the fourth place to be filled. He would, nevertheless, emphasise the importance of securing representation on the Committee for the Red Cross Societies. These Societies had been represented on the Provisional Health Committee, and representation on the Provisional Health Committee was a precedent to which appeal had already been made in other cases.

Theoretically, the activity of the Red Cross Societies lent considerable importance to their representation on the Committee. Moreover, the League of Red Cross Societies was mentioned in the Treaty of Versailles.

Their representation also had a technical interest, but he would not insist on this point. He merely desired to remind the Committee that the League of Red Cross Societies, in particular, had shown considerable activity in the field of work which was of special interest to the Health Committee.

If agreement could not be reached between the two international organisations, it appeared to him that the League of Red Cross Societies should in any case find a place on the Committee.

The PRESIDENT proposed that the three new members should be invited to take part immediately in the work of the Committee. Two of them would be able to accept this invitation, but Dr. Alice Hamilton, who was at the moment in America, would not be able to assist at the present session.

Sir George BUCHANAN recalled the fact that, in accordance with established procedure, it was the Secretary-General's duty to take the necessary measures for the ratification by the Council of these appointments.

The PRESIDENT explained that he had consulted the Secretary-General in advance and that the latter had approved of the proposal that the Committee should invite the new members to take part in its work immediately.

As regarded the representation of the Red Cross Societies, the President had been informed that a letter had just been addressed to the Secretary-General by the League of Red Cross Societies asking that the Health Committee might postpone its decision regarding the representation of the International Red Cross Organisations. A name had previously been suggested by the League of Red Cross Societies which had been agreed to by the International Committee of the Red Cross; the League had just withdrawn that name by letter, and the International Committee of the Red Cross had notified its approval of this procedure.

The President suggested that the Committee might perhaps agree that a representative of the Secretariat of the League of Red Cross Societies and a member of the International Committee of the Red Cross should be authorised to attend the meetings of the Health Committee when questions which were of interest to their organisations were being discussed. He would remind the Committee that the Chief of the Section of Industrial Hygiene at the International Labour Office, who had had a seat on the Provisional Health Committee, was now attending the meetings under a similar arrangement.

The President's proposal was adopted.

8. **Report of the Medical Director.**

Dr. RAJCHMAN recalled the fact that his report (Annex 2) had been distributed to the members of the Committee three weeks ago. This report was in two parts. The first summarised the resolutions in health questions concerning the work of the League of Nations, which had been adopted by the fourth Assembly and by the Council since the last session of the Provisional Health Committee. The second part of the report referred to the general activities of the Health Organisation. Dr. Rajchman asked to be allowed to give certain additional information on the method of work adopted by the Health Section and on the work of the Sub-Committees.

Up to that moment, the epidemic situation in Eastern Europe had been the principal question dealt with at the outset of the sessions of the Provisional Health Committee. The Committee had been faced with the problem of preventing the spread of epidemics and of preserving the public health of Europe and of the world in general. The nature of the problem had, however, changed in the present year. The members of the Committee would find in the report of the Epidemic Commissioner all possible information regarding the present situation. As the charts prepared by the Health Section showed, the epidemic situation was better in regard to typhus, relapsing fever and cholera. Since the summer of 1923, this improvement was especially noticeable in Poland; in Russia also, the improvement was marked, although the figures were less reliable. On the other hand, an extension of malaria in Russia was to be noted. There had been some 4,800,000 cases registered.

At the beginning of its work, the Provisional Health Committee had been faced with a formidable epidemic in Eastern Europe. The Epidemic Commission had to find means to organise on an international basis, the campaign against this epidemic but it fell to the Provisional Health Committee to take the first steps to organise an Epidemiological Intelligence Service which was set up by a decision taken at the first session of the Committee. On the recommendation of the Provisional Health Committee, the Health Section had confined its investigations at first to Eastern Europe and had published from time to time epidemiological reports.

Simultaneously, however, endeavours had been made to collect official information from the largest possible number of health services. With this object, the Provisional Health Committee had, at its first session, examined the means whereby this information should be collected. A suggestion to establish medical correspondents in various countries was examined, as also one to collect all possible information from the medical Press. This period of the work might be described as one of preliminary experiment. Endeavours had also been made to interest the principal telegraphic agencies, but without any very striking result. Little by little the work had become more systematic, and the subsidy of 32,000 dollars for five years granted by the International Health Board of the Rockefeller Foundation had made possible the organisation of a service, of which the task was summarised in ten articles drawn up by the Provisional Health Committee.

The members would all realise how difficult it was to collect epidemiological information. A year of effort had been necessary in order to obtain a regular supply of published official intelligence regarding nearly every country in Europe and the other continents. This information had, for the last seven months, been published in a Monthly Bulletin, the publication of which had been approved by the Provisional Health Committee.

A close contact with the health services of all countries was maintained at every stage in the development of this work. The information, if it were to be published, had to be of practical value and must also possess documentary value in view of future study. As the figures furnished by the several national health services were not drawn up on a comparative basis, it had been necessary to adopt a system of examination by which it might be possible to understand the meaning of the figures collected. It will be recalled that, with this object in view, a request had been despatched to the health administrations of the different countries that they should furnish a report on the organisation of the health services in their countries and on the statistical methods employed. The Health Section of the Secretariat examined these reports and endeavoured to find means of sorting and classifying the information collected.

It appeared to be of interest to go further and to formulate certain general conclusions based on the reports which came in each month. In accordance with this decision, the Monthly Bulletin now contained a summary designed to draw the attention of the reader to the salient features of the situation. A circular letter had been addressed to all the health administrations requesting them to formulate their observations and criticisms on these periodical publications.

A useful step had been taken at Geneva itself by assuring the collaboration of the statisticians belonging to various countries. Thanks to a further subsidy from the International Health Board of the Rockefeller Foundation, statisticians of eight or nine countries had been enabled, during a period of two or three months, to examine at Geneva the information which had been collected. The Health Section had, from the beginning, closely collaborated with representatives of several health services; thus, for instance, the expert of the Medical Statistics Department of the British Health Service had undertaken a comparative study of the statistics for the Netherlands and Belgium with the assistance of the Health Section, and a preliminary collection of statistics of great interest had been drawn up. Other collections would follow. Thanks to the kindness of Dr. Lutrario, the Health Section had come into contact with two Italian statisticians; the Health Section had also opened relations with the Chief Statistical Officer and with representatives of the statistical services of the health administrations of Germany, Austria, Hungary, Czechoslovakia, Bulgaria, Switzerland and Russia.

A systematic effort was necessary in order to study thoroughly and fully the problem of the uniformity of public health statistics. Thus, for example, the value of the figures of mortality depended on the method of registration of deaths, on the classification of the causes of death, on the method of determining the number of the population, etc. In the plan which

had been adopted, the experts of the different national services with which the Health Section was in contact had been approached and requested to prepare memoranda on different subjects. All this work had been undertaken with a view toadvancing the study of epidemiological data.

It was perhaps interesting also to endeavour to find a rapid procedure for the transmission of the information which had been collected. The Committee might perhaps examine at the end of the present session a proposal to the effect that a telegraphic code should be established for the transmission of epidemiological information to the Health Section.

The information which had been collected mostly dealt with European countries, for considerable delay had been experienced in obtaining data from more distant countries. In order to obtain information on the situation in far-distant countries, the Provisional Health Committee had sent two commissions which had drawn up very valuable reports on the situation in the East and in the Far East, but a rapid method of transmitting regular information would have to be organised.

Dr. Rajchman then proceeded to an analysis of the interchanges of public health personnel, which had given interesting results; about 120 health experts belonging to some twenty countries had taken part in them; the Provisional Health Committee had drawn up a general programme, while leaving to each health administration the task of organising the visit in its own country. The collaboration between health administrations and the Provisional Health Committee had resulted in establishing relations which would prove of the greatest service.

Passing to the work of the current session of the Committee, Dr. Rajchman desired to draw the attention of the Committee to the fact that one of the principal duties of the Provisional Health Committee had been to discuss and to adopt a budget which was finally approved by the Assembly on the proposal of the Supervisory Commission.

The Health Organisation was one of the three great technical organisations of the League of Nations, the two others being the Transit Organisation and the Economic and Financial Organisation. These three organisations were conceived on the same plan, namely: a general Assembly, an Advisory Committee and a Section of the Secretariat of the League. The technical duties of the Section of the Secretariat dealing with health questions were assigned to it by the Health Committee. It was appointed by the Council, on which, however, it was dependent, through the intermediary of the Secretary-General of the League.

The Health Section hoped that the Committee would approve its work and would give it the necessary instructions in order that a fruitful collaboration might be assured.

The PRESIDENT thanked Dr. Rajchman for his clear and detailed summary, which would serve as an introduction to the Medical Director's report. This summary would be of great use, for it was important that all the members of the Committee should recognise the complex nature of the work and the conditions under which it was being performed. It would be of great use to the Committee if the Medical Director would give detailed information regarding the working of the Health Section, all the more so as the members of the Committee would have to discuss the rules of procedure, which formed part of the agenda.

It was the custom for the report of the Medical Director to be discussed and then approved by the Health Committee. This year the report was in two parts, the first of which contained an historical summary, which would give rise to no discussion.

He proposed therefore that the Committee should begin by discussing the questions which had not been made the object of a special report, beginning with the question of the interchange of public health personnel, followed by the work of the Epidemic Commission.

This proposal was adopted.

9. Meetings of the Committee.

The Committee decided to hold one meeting each day, at 10 a.m., leaving the afternoons free for the work of the sub-committees.

10. Appointment of Sub-Committees.

Professor Léon BERNARD asked whether it would not be desirable immediately to allot the work to sub-committees, especially to those which had already been appointed.

The PRESIDENT was of opinion that it would be difficult to appoint sub-committees immediately, because experience had shown that the work which was done in the sub-committees often had to be done again in plenary session. The task of the sub-committees would rather be, he thought, to draw up resolutions on the basis of the discussions which had taken place in the full committee.

Dr. RAJCHMAN thought that the rules of procedure should be submitted to a sub-committee. Further, Dr. Carrière had prepared a report in the name of the Opium Sub-Committee. It would be of use for the Committee to begin to study this report as soon as possible in case the establishment of a sub-committee might prove necessary.

The PRESIDENT said that he would submit proposals at the next meeting regarding the composition of the Sub-Committee on the Rules of Procedure.

Sir George BUCHANAN referred to Dr. Rajchman's remarks regarding the importance of the budget of the Health Committee. It should certainly be studied very seriously, and the Committee should have before it the amount of credits at its disposal for the year 1924, as well as the proposed

expenditure for 1925. The Committee would only have the present session in which to examine the budget, as the provisional budget for 1925 would have to be ready, in accordance with the procedure of the Secretariat, by next April. He suggested that a small sub-committee should examine the proposals for the budget for 1925.

Dr. RAJCHMAN suggested that the Sub-Committee on the Rules of Procedure should also be entrusted with the examination of the budget.

The budget for 1924 would immediately be communicated to the members of the Committee.

With regard to the budgetary provisions for 1925, the Medical Director had not yet been able to draft them. It was, indeed, only during the present session that the sub-committees would formulate their requests for credits, which would have to be examined by the Health Committee and by the Medical Director.

M. VELGHE thought that the bureau of the Health Committee was particularly qualified to examine the budget.

Sir George BUCHANAN agreed with M. Velghe. All that he asked was that the Committee should discuss and approve the budgetary provisions for the year 1925.

M. VELGHE desired to make a general observation on the Medical Director's report.

The whole Health Section had displayed great activity, and it could be said that the work had been accomplished in a sufficiently scientific manner. The Medical Director had not been able, during the period of organisation, to adopt a systematic and definite plan. Successive improvements had been made, and at the moment the method of work of the Section seemed to be satisfactory.

If the Medical Director could furnish the Committee with a detailed summary of the present organisation of his Section, explaining which services might be completed and, if necessary, suggesting improvements, the Committee would then be able to decide on the work to be entrusted to the Section and to give the necessary instructions. One thing which was certain was that the past and present activity of the Section inspired confidence in its future work.

The PRESIDENT agreed with M. Velghe and thought that Dr. Rajchman would be able to give a detailed explanation of the work of his Section when the members of the Committee visited the Section.

Dr. RAJCHMAN thought that the administration of the Section ought first of all to be examined by the Sub-Committee on the Budget.

This proposal was adopted.

Dr. PITTALUGA desired to express his admiration for the clear summary given by Dr. Rajchman.

11. Interchange of Public Health Personnel.

That part of the Medical Director's report relating to the interchange of public health personnel was read.

The PRESIDENT thought that this was one of the most promising activities of the Health Organisation.

M. VELGHE did not think there was any reason to fear an increase in travelling expenses, if the proposal he was about to make were adopted.

He wondered whether it would not be necessary to make the interchanges of public health personnel less frequent so that those who organised them, and especially the Health Section, could derive as much benefit as possible from the experience gained. He was a convinced supporter of these interchanges. All the health staff of the Belgian Administration had benefited from the experience gained by those of its members who had taken part in the interchanges. This was probably the case in other countries, but it would be necessary to improve each new interchange by taking into account the results of those which had already taken place.

In this direction there was perhaps a deficiency to be met. The Health Section might give more indications to the various health services which ought to draw more inspiration from Geneva. The Medical Director might usefully intimate the criticisms to which the interchanges had given rise, as he was in touch with all those who took part in them. A member of the Health Section had participated in the interchange organised in the United States, and his collaboration had been very useful. Even if this proposal involved some slight supplementary expenditure, a member of the Health Section should take part in all the interchanges.

As regarded the reports of those who took part in the interchanges, only a portion of these reports could, it seemed, be published, but the whole would always be a valuable source of information for the members of the Committee.

Sir George BUCHANAN agreed with M. Velghe. He thought that the system of interchange of medical personnel had worked extremely well but that it should be carefully considered by the Committee in order to effect improvements. There was at the moment an interchange taking place in England under the auspices of the Society of Medical Officers of Health, with which he had personally collaborated. The Ministry of Health was looking after the visitors as far as London was concerned before they went to the provinces. At the Ministry of Health the heads of sections had drawn up pamphlets on the particular work of their own sections both in the Ministry and

in the provinces. This had given excellent results. A pamphlet, for instance, had been prepared in regard to food standards, about which questions were frequently asked.

He suggested that this practice of preparing pamphlets might be adopted in other countries. At the moment, four pamphlets had been prepared by the heads of four different sections of the British Ministry of Health on tuberculosis, health control in ports, food standards, and general hygiene. He hoped that next year other pamphlets, for example, on health insurance and epidemics prevention, would be completed. He trusted that every member of the Committee would receive a copy of these pamphlets, which were authoritative and would give adequate information of the prevailing practice in England.

He was not in favour of the League publishing the reports of visitors on their visits, because it was impossible for the average visitor to learn sufficient of the practice prevailing in the country to which a visit was made for him to draw up a really comprehensive or accurate report. It was seldom that visitors possessed the unusual ability in this matter which was lately shown by Professor Léon Bernard, whose report of his visit to England was of exceptional interest and accuracy.

Sir George Buchanan further considered that the duration of the visits was at present too long; a maximum of six weeks should be laid down. He was not in favour of the addition of sanitary engineers to the parties of medical men visiting a country. He requested further information on the situation in the Far East.

In conclusion, the work done had been good, but there was still room for improvement, and he had no doubt that next year further improvements would be made as those responsible for the instruction and management of the interchange gained more experience of the information which the foreign visitors needed. It was for this reason that he was not in favour of too many new programmes. It would be better to improve on the lines which had been proved to be promising

Dr. Lutrario congratulated himself on the success of the interchanges, of which he had been one of the originators. Part of the success was also due to the Medical Director, who was to be congratulated.

He asked to be allowed to present an observation which was not intended as a criticism. The interchanges followed one another too rapidly, and the programmes were too heavy. Those who participated in them had been overworked in Italy as well as in America. They had not had a moment's rest in the United States, and contact with the various services had been too slight to leave behind them impressions which were sufficiently clear. He desired to draw attention here to a danger which threatened seriously to impair the value of these interchanges

Professor Léon Bernard observed that it was for the administration which organised a visit of this character not to overload the programme. On the other hand, the danger of overwork must not be exaggerated. He himself had endeavoured during his travels to see as much as possible, and he would like to pay a tribute to the authorities which had facilitated his task. If those who had participated in the interchange had complained in Italy of overwork, this was probably because they had wished not only to profit from the object of their stay in the country but also to admire the ancient and modern treasures which it contained.

As regarded publications, there were three categories between which it was necessary to distinguish: the official publications, to which Sir George Buchanan had alluded, would render important service both to those who participated in the interchange and to those who were unable to do so; these were to be considered as documentary work but could not be identified with those mentioned in the discussion and which constituted a second category of publications prepared by those taking part in the interchange. It was natural that the travellers should desire to record what they had seen, but it might happen that those who took part in an interchange were not in agreement. It happened, for instance, that the French officials had published their impressions in two distinct publications. As regarded published documents under the auspices of the League of Nations, and which, in consequence, involved its responsibility, a very delicate question arose which would necessitate the institution of a control which had yet to be defined.

Dr. Rajchman asked M. Velghe to excuse the brevity of his report. He had thought it his duty to refer to the decisions taken in order to place the programme of the Committee for 1924 in its true light, and he had not been able to enter into the details of the interchanges of health personnel. The interchange organised in Belgium had been a great success in every way. For that reason it had not been necessary to discuss in detail with M. Velghe the organisation of the interchange for the study of tuberculosis. As regarded the interchanges in Great Britain the Netherlands, Denmark, Switzerland and France, it was necessary to leave considerable liberty to those who were organising them, but each of these interchanges had been the subject of a detailed preliminary discussion.

As regarded the question of overwork, all the doctors complained, but the same doctors who complained of overwork in a particular country themselves gave rise to similar complaint when they came to organise an interchange in their own country. He would prepare a note on the experiments made and the results obtained.

As regarded publications, he regretted that his proposals had been lacking in clarity. The pamphlets to which Sir George Buchanan had referred showed very great initiative.

During the past year a general report on the first interchange in England had already been published through the intermediary of the British Organising Committee; complete texts of the lectures which had been given at Vienna during 1923 had also been published. The same had been done as regarded the Netherlands, Denmark and Switzerland. This documentation ought to be kept up to date.

This represented the first category of publications. The second included the reports on special questions prepared by those participating in the interchange, and he could assure

Sir George Buchanan that a very remarkable set of documents had, after a six-weeks visit, already been published in the medical Press or prepared in manuscript by those who had taken part in the interchange.

The third category of publications would be the reports prepared by a group of experts invited by the Health Committee to study on the spot some definite problem of public hygiene, by utilising the facilities afforded by the interchanges.

He would reserve for the next meeting his reply on the other observations which had been made.

SECOND MEETING

Held on Tuesday, February 12th, 1924, at 10 a.m.

Dr. MADSEN in the chair.

12. Members and Additional Members of the Committee.

The PRESIDENT welcomed Dr. Chodzko and informed the Committee that Dr. Tsurumi would be proposed by the Japanese Government as successor to Dr. Miyajima, who had been the Japanese member on the Provisional Health Committee. This proposal would be submitted to the Permanent Committee of the Office international d'hygiène publique at its next session.

13. The Earthquake in Japan.

On the proposal of Professor Léon BERNARD, the Health Committee decided to send a telegram to Dr. Miyajima, who had escaped with his family from the recent earthquake, as well as to the Japanese Government.

M. KUSAMA thanked Professor Léon Bernard and the Committee for their expression of sympathy. He gave an account of the precarious condition of Japanese doctors at the present time and informed the Committee that Dr. Tsurumi would reach Paris towards the end of March.

The PRESIDENT stated that, in his capacity of Chairman of the Provisional Health Committee, he had already sent a message of sympathy to Dr. Miyajima.

14. Interchange of Public Health Personnel *(continuation of the discussion).*

Dr. RAJCHMAN recalled the general lines of the programme for the interchange of public health personnel which had been drawn up by the Provisional Health Committee. That Committee had been principally concerned with the choice of candidates, the choice of countries and the length of the visits.

It had been found in practice that it was best to know from three to six months in advance the names of the candidates. A circular letter had been sent to all health administrations asking them to submit the names of candidates. When the names were known it was possible to organise the interchange visit, taking account of financial and other conditions. Certain countries — Switzerland for example — asked that not more than twenty persons should take part in a visit. The Latin-American countries had shown particular interest in the interchanges in which they earnestly desired that their candidates should take part.

The success of these interchanges depended in great measure on the choice of the candidates, and the Committee should be in a position at the moment to draw up a programme of action for several years. With this end in view the work should be divided up in order to prevent duplication with the International Health Board of the Rockefeller Foundation. The Rockefeller Foundation had founded scholarships and was particularly interested in young officials belonging to the health administrations, while the Provisional Health Committee had decided in principle to choose, above all, candidates with a certain amount of experience and bearing administrative responsibilities. If each health administration made known the most important posts in the country, from the point of view of public health, the Health Committee would be in a position to facilitate systematically the participation of the holders of these posts in the interchanges; on the other hand, the Rockefeller Foundation would grant scholarships to those who were preparing to occupy such posts.

Regarding the choice of countries, the Provisional Health Committee had discussed at one of its last sessions the difference to be made in dealing with large and small countries. In a large country it was not possible to show everything to those taking part in an interchange visit, but they could be shown in each district the working and organisation of the health services. It was easy, on the other hand, to traverse the smaller countries from end to end. Two types of visits had therefore been established.

The interchanges organised in Great Britain had been of the type of visit to a large country, and in this case the essential question in regard to the visits had been successfully solved. The ideal would be individual visits, but this could only be realised if the participants in the interchange visit did not number more than twenty. In Great Britain the participants had been divided into groups of three and distributed over seven or eight representative districts at the close of a period of general conferences in London.

The pamphlets of which Sir George Buchanan had spoken would be of great service during the first period, because, by means of them, participants in the visit would be able to obtain the requisite information and to prepare themselves for the next period. At the end of the second period the participants would return to London to discuss the results of their investigations and to formulate general conclusions.

It had not been possible to prepare in the same way the interchange visits organised in the United States. Further, the great size of the country militated against dividing the visitors into small groups. Visits to the United States were of considerable interest and novelty.

Belgium was a typical small country. The interchange visit which had been organised there had succeeded at every point. M. Velghe had been able to show everything to the participants, thanks to the special facilities which the country offered. Belgian officials had been able to take part continuously in the interchange visit, but the number of participants had perhaps been too numerous to allow of them all putting in full the questions which they desired on the subjects which were of particular interest to them.

In Denmark, the participants would be divided into two groups. In the Netherlands it would be possible for them to study for a time the health administration in the towns.

It was impossible for one single plan to be applicable to all countries, and, as Sir George Buchanan had said, each year would show progressive improvements.

The question whether collective interchanges were of greater use than individual interchanges had been considered. Sir George Buchanan favoured individual interchanges, but these were only possible if the candidates, the choice of whom was particularly difficult, fulfilled the conditions of an international interchange. The Provisional Health Committee had decided to begin in this field by an interchange of specialists. Dr. Lutrario had organised in Italy a visit of ten specialists in malaria. This experiment had proved a great success, but it had appeared that it was necessary to limit the choice of the participants in such an interchange visit to real experts.

A further experiment in respect of specialists had been tried by arranging an interchange visit of bacteriologists from laboratory to laboratory. The object of this interchange had been very limited and the question arose as to whether similar interchanges in other fields could be made.

A third type of interchange of specialists was that of medical officers who were experts in the campaign against tuberculosis. They would visit successively several countries; from Vienna, one of the principal breeding grounds of tuberculosis in Central Europe, where they would stay ten days, they would go to Czechoslovakia, where they would stay four days, then to Budapest, where they would also stay four days. They would then go to France, where they would be divided into three groups, then to Belgium and Great Britain, where their visit would be divided into three periods: the period of general conferences in London, the period when in small groups they would examine the provinces, and, lastly, the final period in London; they would then visit the Netherlands and Switzerland.

It had been thought necessary that the tuberculosis experts should visit several countries. Experts in school medical inspection and school hygiene would only visit three countries, namely: the Netherlands, Belgium and Great Britain.

As M. Velghe had said, it was of great use for a member of the Health Section to accompany the participants in interchange visits. This had been done as often as possible. A member of the Section would accompany the tuberculosis experts for the first part of their journey, but he could not assist during the period of special study in small groups.

The Medical Director's report contained a certain number of suggestions which the Committee might discuss. M. Albert Thomas had asked that an interchange of medical inspectors of factories should be organised. The question of housing in connection with health might also be made the object of an interchange visit. If the funds were sufficient it would be very desirable to organise a limited interchange visit during 1924 in the Far East in order to prepare for the interchange visit contemplated for the year 1925.

The Committee had further received an official invitation from the Kingdom of the Serbs, Croats and Slovenes and an unofficial invitation from Russia for 1925.

The PRESIDENT, speaking on behalf of the Committee, thanked Dr. Rajchman for his summary.

Dr. CARRIÈRE, like M. Velghe, and for the same reasons, considered that the interchanges should not follow each other at too short intervals, so that each interchange could benefit from the observations and the experience of the previous one.

In reply to a remark from Professor Léon Bernard, who considered that those who took part in the interchanges could not be prevented from publishing their impressions, he pointed out that there would be some risk in admitting this point of view and in allowing the delegates to think that they could publish anything they pleased. The delegates taking part in the interchanges were officials; their impressions were to some extent the property of the Governments which appointed them, and the latter were therefore entitled to ask them to maintain a certain reserve. It therefore seemed to him necessary to exercise a censorship of the reports of the delegates in order to preclude the publication of ill-timed observations. Under these conditions, the publication of the delegates' reports might be of real value.

In view of the interchange which was to take place in Switzerland in August and September 1924, he proposed to publish, for the general guidance of those taking part in the interchange, a pamphlet of about a hundred or a hundred and twenty pages, giving a brief survey of the Swiss health organisation. They would also receive a number of memoranda on special questions, such as tuberculosis, venereal diseases, goitre, etc.

After a stay of about a week at Berne, during which the participants would attend lectures on the health institutions of the country, they would visit various centres in German and French Switzerland. Dr. Carrière would endeavour to organise these visits, if not by individuals, at least in very small groups, as had been done in Great Britain. Finally, during the last stage of the interchange, the participants would reassemble for an inspection of certain Swiss institutions.

As regarded the participants in the special interchange in connection with tuberculosis, it was proposed, first, to assemble them at Berne for a general conference, and then to send them to Lausanne and Zurich, two of the chief centres of the campaign against tuberculosis.

Switzerland regretted that she had been unable to take an active part in the interchanges earlier, notwithstanding the great interest she took in this new scheme. She was glad she had been able to remedy this, and she was very grateful for the welcome extended to her delegate in the United States. It was also with great satisfaction that she now found herself able to organise an interchange, and she hoped that those who took part in it would profit thereby.

Dr. JITTA was of opinion that pamphlets prepared for interchange visits would be of the greatest value, even to those who did not take part in the visit.

The distinction which had been made between large and small countries referred specially to the area of the countries. The health organisation of a small country could often be compared favourably with that of a large country.

Participants in the interchange visit to the Netherlands would be divided into groups of four. It was proposed that they should stay a week in a large city and that they should be given at The Hague a general idea of the health organisation of the country, general institutions, laws concerning veterinary inspection, foodstuffs, etc. The Netherlands took great interest in the system of interchanges and would to her best to give satisfaction to all the participants.

M. KUSAMA said that the report of the Medical Director was so complete that there remained very little for him to add to the interesting proposals which had been made.

If the Committee took, as proposed by the Medical Director, a decision regarding the interchange plan for 1925, Japan would be happy to organise an interchange.

It was a little difficult for the Japanese authorities to grasp fully what was required in the organisation of an interchange by reason of the distance of the country from those countries in which experiments had been made. He would be happy if the Committee could arrange for his country to profit by the experience gained as a result of the previous interchanges and if an outline of what was desired could be sent to the Japanese authorities in sufficient time before the interchange.

M. VELGHE said that he, like all the other members of the Committee, had followed attentively the statement of the Medical Director in regard to the programmes of interchanges. This attention was a proof that the members of the Committee were not so familiar with the question as Dr. Rajchman, and, in spite of the explanations which the latter had given, he feared that the Minutes could not furnish as complete an account as the explanations given by the Medical Director. He asked the latter to prepare a short note giving the points on which the Committee's decision was required.

The countries which had been asked to prepare the interchanges had not the experience of Dr. Rajchman. It would be well for the Health Section to give very careful instructions for the preparation of these interchanges in order that each country might be able to benefit from previous experiences and in order that the interchange might give the best possible results.

The Medical Director had not given any opinion on the question of the frequency of the interchanges. He thought that he ought to insist on the question because the statements made in the Committee emphasised again its importance for the following reasons:

(1) The preparation of documents in advance required time. Countries in which the interchanges were arranged must therefore be warned sufficiently in advance and should be familiar with what had already been published by the Health Section, thereby profiting by previous experience.

(2) The choice of candidates must be made three, four, five or even six months in advance. The choice of candidates was very difficult.

As it was necessary to prepare the interchanges a long time in advance, preparations for one interchange should begin immediately at the close of the previous one. It appeared that two interchanges a year would be sufficient.

Dr. Rajchman had explained the various types of interchange. A true interchange was only effected when an official of country A took the place of an official in country B, who took the place of the latter in country A. This system only appeared to be possible in respect of laboratory work; but experience had shown that it was not advisable for a laboratory assistant to take the place of one of his colleagues; it was sufficient that he went as supernumerary in a laboratory, so that he could become familiar in a few weeks with the work there.

As regarded the interchanges of health officials, there were two special kinds: (1) general interchanges and (2) interchanges of specialists. An interchange between municipal officials was proposed. As regarded Belgium, he had arranged that those participating in the interchanges should not be confined to State officials but should include municipal officials. Reservations would have to be made as regarded the participation of sanitary engineers in the interchanges

for medical officers, for these technicians had not the same qualifications or training as the medical officers. This did not imply that interchanges between medical officers and sanitary engineers was to be discouraged, but at first sight he was not sure that they could be recommended. It might perhaps be better to arrange a separate interchange for sanitary engineers.

M. Velghe pointed out that England had done wonders in the purification of the water supply, and that for practical and economic reasons other countries had been unable to obtain the same results. The sending of sanitary engineering experts to England would be generally useful.

As regarded the interchange for the study of terminal disinfection, he was more doubtful. In the United States, disinfection during sickness was recommended and terminal disinfection neglected. Even if those participating in the interchange were in favour of the American system, he was of opinion that terminal disinfection should be maintained, for the present, for psychological reasons, as it constituted an effective means of getting into touch with certain classes of the population.

In Belgium, disinfection after sickness had become customary. The people asked for it, even in the case of diseases which were not infectious — a fact which enabled contact to be maintained with the families, and which was of value in a country where there was a very strong sense of independence and where the health organisation depended largely on propaganda and not on compulsion. The possibility of disinfection permitted of the sending of a nurse who asked questions and gave advice on the disinfection during the disease and on all other prophylactic measures. Terminal disinfection accordingly constituted at present a social necessity and afforded an opportunity for actual propaganda.

Moreover, the discussion of this question was more academic than practical. A visit of investigation to the United States to ascertain the merits of terminal disinfection as compared with disinfection during sickness could hardly yield any new light on the question.

Professor Léon BERNARD supported the observations of M. Velghe. It resulted from all the considerations presented that, in respect of two or three questions, it was necessary for the Medical Director to enlighten the Committee and for the Committee to acquaint the Medical Director with its views. He was therefore of the opinion that Dr. Rajchman should put his proposals briefly into writing, and the members of the Committee might then indicate their opinions at a later meeting.

There was first the question of the time which should elapse between the interchanges. The Governments which had already organised interchanges would be particularly qualified to give advice on this subject. Secondly, as regarded the procedure to be followed, it should differ according as the interchanges were to be of the general or special type and in accordance also with the extent and character of the health organisations of the interested countries. It was impossible to compare missions of investigation in England and in America. The States of Massachusetts and New York were very well organised from the health point of view, whereas in other States the health service was very elementary. In England, on the contrary, there was an organised system which applied to the whole country.

In France the best subject for study from the health point of view was the organisation against tuberculosis. This organisation, with the exception of the sanatoria, was essentially private. The State merely supported it financially and controlled it to a certain extent.

Accordingly, when Professor Léon Bernard had, at the request of Dr. Rajchman, organised the interchange in France for the study of tuberculosis, he had acted in the name of the National Committee and had merely obtained the approval of the Ministry of Health. In England, on the contrary, the organisation against tuberculosis was in the hands of public authorities.

As regarded the organisation of missions, he did not think that the Health Section could organise them from Geneva. It could scarcely do more than give very general indications.

The question of publications was difficult and delicate. Preliminary documentation was very important. In England it was easy to prepare this documentation, thanks to the abundance of material in existence, but it had been difficult for him to get together the necessary documents in France in preparation for the mission to investigate tuberculosis.

Dr. Carrière had said that, contrary to what Professor Léon Bernard had imagined yesterday, it would be well not to leave too much liberty to those taking part in the interchanges as regarded the publication of their impressions; but in this case governments or other bodies organising these missions should warn participants that these publications would be controlled.

Dr Rajchman had referred to reports on definite questions. Such reports did not fall within the province of the interchanges and had not yet been contemplated by the Committee. When the Committee desired to study problems such as disinfection or the purification of the water supply, it ought not to proceed by means of an interchange but give missions to specialists and entrust them with the preparationof a report.

Dr. PITTALUGA said that as the discussion had been exhaustive he would not present certain observations which he had originally intended to make, but he would like to make a systematic summary of the points discussed.

Personally, he belonged to a country which was in full process of internal organisation but which was still very far from possessing public health services comparable with those of the great countries of Central and Western Europe. The whole discussion on interchanges had been directed towards questions of method, but it was necessary to allow for potential differences between countries from the point of view both of what they could gain from the interchanges and what they had to offer to those taking part in them.

There were three points of view, or, if it were preferred, three objects to be attained by the interchanges:

(1) Improvement of the health services of each country, particularly where those services were less highly organised;
(2) The possible unification of the methods of the health administrations, or, at least, the modifications which the reciprocal influence of knowledge acquired by the personnel of the interchanges might introduce into the different health service organisations;
(3) The formation of an international sanitary organisation, or, at least, the formation of a group of persons who could be used for the attainment of this object.

When the Committee discussed the effectiveness of possible methods it tended to lose sight somewhat of the object for which the interchanges were held. In the countries where the health services were less perfect a visit of the heads of services or of specialists would be more useful than the despatch of a group of young doctors without experience. A visit of the latter kind would only result in confusion rather than in progress.

It would be necessary to choose the participants according to the interchange: for such an interchange, specialists; for another, experienced officials sent in a limited number for the purpose of an enquiry. Finally, in other cases, young and active personnel with technical preparation, who might afterwards be engaged in their own country or by international organisations.

There was a further question which did not perhaps fall directly within the limits of the problem of interchanges. It would be well to invite journalists, as the United States had done.

Dr RAJCHMAN said that it would be impossible to defray this expenditure from the budget of the Health Organisation.

Dr. PITTALUGA said that in order to obtain acceptance for work of a technical character it was necessary to organise propaganda. He understood the objections of Dr. Rajchman, but he asked the President to keep his idea in view for a later occasion.

The question of terminal disinfection after illness was of some delicacy. If a young doctor went to the United States, he might arrive at conclusions which were too hasty and too far-reaching and which would be incorrect. The Medical Director certainly meant that this study should be done by personnel with scientific training.

It might be possible in 1925 to arrange for some useful study to be carried out in Spain. Putting on one side the problem of malaria, which in Spain might constitute an important field of study, there was in the centre of Spain an endemic centre for goitre, accompanied by cretinism (6,000 to 7,000 inhabitants), which was largely influenced by a factor already known, namely: endocrine insufficiency.

For the last two years this question had especially received the attention of the health service, and a commission had been appointed composed of well-known specialists such as M. Maranon and M. Goyanes. Interesting results might be obtained by means of a visit of medical officers of health administrations from countries interested in the etiological and epidemiological aspects of the problem of endemic goitre and collective endocrine insufficiency.

Sir George BUCHANAN thanked his colleagues for their favourable comments on the arrangements made for the interchange courses in Great Britain. They would be appreciated not only by the central health department and by the Medical Officers of Health and their society but also by the local authorities, such as the great municipalities, the county councils, the London County Council and the City of London. The health organisation in England was extremely decentralised. No pressure was brought to bear on these authorities, which were merely invited to participate in the arrangements. and had done so with the greatest goodwill.

As regarded the proposal of Professor Léon Bernard to codify the various proposals which had been made in a report so that the Committee might take a decisions on the subject, he would point out that the arrangements for the interchange courses required a special measure of latitude to be given to the Health Section. and the Committee would not desire to control the organisation too rigidly. It merely wished to assume responsibility as regarded the general leading principles. He accordingly supported the proposal in question.

The report of the Medical Director included reference to three points: (1) the various kinds of interchanges, (2) a suggested interchange of medical inspectors of factories, and (3) suggested interchange of housing inspectors.

These last two questions were very important, but they must be made the subject of thorough examination to see if they were practicable at present. Political circumstances might, for example, render a "housing" interchange inopportune at the present moment in certain countries. It would be well to defer both questions until the next session.

The question of the necessity of terminal disinfection after infectious disease was not only a medical but also an administrative and legal question. If it were desired to compare notes from different countries and to discuss the question internationally, the matter might be referred to the Office international d'hygiène publique with a request that it should be added to the agenda of an early session. A larger number of countries were represented at the Office international than on the Health Committee, and it was precisely the kind of discussion which was usual at the Office which would be most useful in this instance. If after the discussion some special point emerged which required an intensive study beyond the resources of the Office, the latter might bring the question before the Health Committee. The question of goitre, referred to by Dr. Pittaluga, might also be referred to the Office, which was now receiving a detailed report on the subject from Dr. Carrière as a result of extensive enquiries made in many countries.

In this connection he suggested that since the Office now served as the advisory organ of the Health Organisation, it would be desirable to consider before the end of each session the particular questions which might be sent to it.

With regard to publications, control would be important in certain cases. There was no difficulty over official publications prepared in the country visited. But when foreign visitors described what they had learnt, their reports, even if good, should not, as a rule, be published by the League. They might, of course, be published in medical journals, so long as the League had no responsibility for them, but even this was doubtful.

Dr van Bœckel's report on diphtheria immunisation in America had been mentioned as a useful report for the League of Nations, and he did not doubt that it was excellent. But he drew attention to the fact that in England there was in existence a group of persons systematically opposed to vaccination and inoculation. In this group were persons who took a great interest in social questions in general, and not least in the League of Nations. If it were thought in England that the League was a partisan of inoculation, it would perhaps alienate this portion of the population. This did not mean that in England the Ministry of Health and medical opinion did not support vaccination and preventive inoculation. Personally, Sir George Buchanan waged a daily battle in their support, but the Committee would realise that the manner in which these questions were handled was important, and he hoped that this would be taken into consideration by the publishers of pamphlets.

In regard to the term "interchange", which was neither French nor English but (he believed) American, and one he personally never used if he could help, he preferred the expression "international hygiene course". Since the Committee had now been put on a new basis, it might use the opportunity to employ a new and more accurate expression henceforth.

M. Velghe stated that he had not wished to say that the Health Section should organise the system of interchanges but that the countries which organised such visits ought to get more profit from the experience gained by that Section. Could not the Medical Director contemplate the possibility of drawing up a pamphlet giving general directions for the use of the countries which had to organise exchanges ?

Dr. Lutrario considered that the discussion indicated that, in general, too much was undertaken during the interchanges. He wished this to be stated in a clear and explicit manner, so that, in the future, care should be taken to avoid fixing programmes which overworked those taking part in them. The difficulty in attaining success was the avoidance of excessive fatigue. If this aim were to be attained, it must always be borne in mind that the programme and the duration of the interchange were functions one of the other and were in direct proportion with each other. If it were desired to draw up a programme involving, say, ten units of work, it was impossible to assign to it only five units of time. The inevitable consequence would be overwork, and success would be compromised. The logical conclusion was that either the programme must be curtailed or its duration prolonged.

Like Dr. Carrière, the speaker considered that some control must be exercised over publications. Young officials were too prone to express opinions which were not always sound.

He hoped it would be possible to have an interchange of sanitary engineers. In Italy there were municipalities which spent excessive sums in solving, for example, the problem of the supply of drinking water and of the purification of water. The systems adopted in consequence of the economic and technical investigations made, and the experience acquired elsewhere should be known exactly. He quoted the example of a municipality which had been able to save a sum of nearly two million lire because it had been fortunate enough to secure the services of a conscientious and expert engineer, who had suggested that a well should be sunk instead of conveying water by a pipe from a distant spring.

With regard to an investigation of terminal disinfection, Dr. Lutrario would only accept it with full reservations.

Professor Léon Bernard recalled the fact that the French Government had been led to put on one side the system of interchanges of health personnel by using the word "échange", but that he had explained that this word was only a bad translation of the American word "interchange". He further associated himself with the remarks already made on this subject, and proposed to employ the term "voyage d'étude". He requested Dr. Rajchman to give this suggestion his consideration.

The President reminded the Committee that the question of bacteriologists had been touched upon in relation to the system of interchanges. It would be necessary to distinguish in this connection two types of activity as regarded bacteriologists: (1) the case of a bacteriologist who would make a complete study of some special method; such a study would necessitate a very variable period of work; (2) shorter visits intended for the investigation of the methods employed in some country or institute. Methods were in existence, employed in laboratories of some country for some considerable time, which were not yet known in other countries and with which the head of a laboratory could become familiar in a very short time.

With regard to the question of an enquiry on terminal disinfection, he considered this to be one of great importance. He did not quite agree with M. Velghe, but the question presented two aspects: technical and psychological. In Denmark, a tendency was manifest to do without disinfection after diphtheria and scarlet fever, and doctors were in agreement on the subject, but they desired to strengthen their opinion by knowing what was being done in the United States and elsewhere. It should be remembered that disinfection measures were costly and troublesome. It would be very useful to know whether these measures were necessary from a technical point

of view. The second point of view — the psychological consideration as presented by M. Velghe — ought to be left to the health administrations. The health officer should be left free to say whether it was a good thing to maintain these measures for technical or other reasons.

He agreed with Sir George Buchanan that the question might be studied by the Office international d'hygiène publique.

He was of opinion that the Committee should facilitate the task of the Office and hasten its work by forwarding to it reports on these questions.

He agreed with the proposal that the Medical Director should be left to draw up the programmes of interchange in collaboration with the health administrations.

Dr RAJCHMAN thanked the members of the Committee for having allowed him a certain freedom of action in organising the system of interchanges.

He made his excuses to Dr. Carrière for having omitted to mention the anti-tuberculosis organisation in Switzerland. The reason for this omission was perhaps because he lived in the country.

When Dr. Tsurumi reached Europe, it would be possible to draw up a plan for the organisation of an interchange visit to Japan.

M. Velghe and Professor Léon Bernard had requested a memorandum on three points. M. Velghe had asked that the memorandum should later be followed by a printed notice, and Dr. Rajchman considered that the plan concerning interchanges and publications should be discussed by a sub-committee. As regarded the printed notice, it would be published after the present session, and he would obtain the consent of the President of the Committee before transmitting it to the governments.

The working of the system of interchanges showed how the Health Organisation worked. The Committee had drawn up a plan and the Health Section carried out the instructions it had received, which were communicated to the health administrations. The duty of the Health Organisation was that of co-ordination.

It would perhaps be dangerous to suppress the word "interchange", which was familiar in two continents. In any case it would be necessary to study the question carefully.

It would be well to leave the Sub-Committee free to fix the number of the interchanges. As for the objects which they pursued he regretted that he was not quite in agreement with Dr. Pittaluga. The first object was to perfect the health system in each country and to provide information regarding the health systems of other countries. It was also important to create *esprit de corps* among the health officials and to support the public health services of the various countries.

Most of the members of the Committee represented countries where these services had for a long time been organised, but there were other countries which were waiting for concrete results from the organisation of the interchanges. It was the constructive part of the scheme which interested them. It would therefore be necessary in preparing the programme for 1925 to take this into account.

Most of the senior officers met twice a year at Paris; but between the senior officers and the younger men without experience there were responsible administrators and it would be well to limit the system of interchanges to this last category of health personnel.

As regarded experts and specialists, the Health Section had endeavoured to find a way of limiting the programmes of individual missions, first by the choice of candidates and secondly by the importance of the problems to be studied. The idea was to inaugurate in the public health field the collective studies inaugurated in serology by Dr. Madsen, which consisted in applying in practice the results already obtained.

As to terminal disinfection, this was a problem of an internal character. Suppose, for example, that the British Society of Medical Officers of Health appointed a Committee of Experts to study a certain number of such questions. A comprehensive report would be submitted which would not bind the Health Committee. The Health Committee, however, might in this way undertake an extremely interesting study of an urgent problem; there was, however, no question of organising such an undertaking immediately.

As regarded inspectors of factories and of dwellings, it might not be possible to organise interchanges immediately owing to budgetary difficulties. The question could, however, be investigated at once. Perhaps the Committee might deal with it in its general report.

Publications must be submitted to a preliminary control. This control was left to the interested health administrations. Nothing would be published without the approval of the immediate chief of the author of the report and of the administration of the country in which the exchange took place. There was no question of publishing a medical education series; the report of Dr. van Boeckel was a report of the kind which should be published. It gave technical details and prudently discussed methods of application. This report would be communicated to the members of the Committee.

Dr. Lutrario had asked that those taking part in the interchanges should not be overworked. This matter would be mentioned in the report. Dr. Rajchman would, in addition, provide the Sub-Committee with certain complementary material.

Sir George BUCHANAN thought that the Committee had already gone very far in the discussion and that it was time to reach conclusions. It would be sufficient, as Professor Léon Bernard had proposed, if the Medical Director would distribute to the Committee a list of the questions which required decision and his own view of the decisions which were desirable. It would be useless to place the question before the Sub-Committee, where the subject would merely be reopened.

The PRESIDENT could not agree with this point of view. The discussion had been useful, but it would be necessary to continue it in the Sub-Committee in order that the debates of the

full Committee might not be overloaded, in view of the importance of the agenda. Moreover, Dr. Rajchman had not furnished definitive replies to the questions which had been put to him

On the proposal of the PRESIDENT, *the Sub-Committee on Interchanges was composed as follows:*

Professor Léon BERNARD, Sir George BUCHANAN, Dr. CARRIÈRE, Dr. LUTRARIO, M. VELGHE.

15. Appointment of a Sub-Committee to consider Opium Questions.

The PRESIDENT said that the Opium Sub-Committee, composed of Dr. Carrière, Dr. Chodzko, Dr. Jorge, Dr. Nocht and M. Velghe, would meet in the afternoon at 3 o'clock.

Dr. CARRIÈRE recalled the fact that, two years ago, the Provisional Health Committee and the Advisory Committee on the Traffic in Opium had appointed a Mixed Sub-Committee which was to study more particularly the questions of a scientific nature which the Advisory Committee might submit to it. Thus, the Mixed Sub-Committee had had to study the question of the enquiries to be made with a view to determining the legitimate requirements of countries as regarded narcotic drugs.

The report which he had prepared and which was now in the hands of the members of the Committee (Annex 3) therefore originated from the Mixed Sub-Committee. He thought its conclusions sufficiently important for it to be discussed by the Committee. It would no doubt be advisable to submit it first to the sub-committee the composition of which had just been announced by the President. This sub-committee was an organisation differing from the Mixed Sub-Committee. It was directly dependent on the Health Committee and would study all the questions which the latter entrusted to it.

As regarded the Mixed Sub-Committee, the question of maintaining it did not depend solely on the Health Committee, and would have to be left open.

16. Appointment of a Sub-Committee to study the Rules of Procedure of the Committee.

On the proposal of the PRESIDENT, *the Rules of Procedure Sub-Committee was appointed as follows:*

Professor Léon BERNARD, Sir George BUCHANAN, Dr. JITTA, Dr. RAYNAUD, M. VELGHE

THIRD MEETING

Held on Wednesday, February 13th, 1924, at 10 a.m.

Dr. MADSEN in the chair.

17. Approval of the Minutes of the First Meeting.

The Minutes of the first meeting were adopted with certain amendments submitted by different members of the Committee.

18. Report of the Epidemic Commission.

Dr. Norman WHITE submitted his report (Annex 4). He had little to add to the explanations already given by Dr. Rajchman, and a few words sufficed to complete the report before the Committee. The Provisional Health Committee had defined the task of the Epidemic Commission and especially the work which it would have to do in Greece. This work was now accomplished and a report on it had been submitted by Colonel Gauthier. The Warsaw office was now being wound up.

The Epidemic Commission had given assistance in Latvia in order to perfect the quarantine arrangements established at Libau. A report on this question would be submitted at a later date.

He had been present at the Pan-Russian conference on malaria which had been held at Moscow and attended by more than 500 doctors. The next issue of the *Epidemiological Report* would furnish information on the present situation in Russia. As Dr. Rajchman had pointed out, the situation had improved considerably as regarded typhus and relapsing fever, which had almost completely disappeared expect for certain circumscribed outbreaks in one or two provinces.

On the other hand, a considerable recrudescence of scarlet fever, measles and diphtheria had been noted. In the Ukraine and the Crimea numerous cases of anthrax had been registered.

Since the beginning of October 1923, plague had broken out, especially in the Kirghiz Republic and in the Kalmuk region. There were about fifty centres of infection. These epidemics had been attributed to epizootics among camels and mice, but it seemed possible that there might have been some confusions in diagnosis. It did not appear probable that camels could really be incriminated. This question would necessitate a further enquiry. Cases of plague had also been registered in the Astrakhan district, but in that region also the disease appeared to be on the decline.

Malaria had always been very prevalent in Russia. Before the war three or four million cases had been registered each year. In 1923 the malaria epidemic had broken out afresh and more than five million cases had been registered, particularly in the German districts of the Volga and in the Astrakhan and Samara districts. Before the war, the end of May had marked the highest point reached by the disease. In 1922 the epidemic curve exhibited two maxima, one at the end of May and a second in the autumn, while in 1923 the September rise was not in evidence for Russia as a whole. The Quaker Laboratory at Buzuluk had observed that benign tertian malaria was most prevalent in May and June, whereas the disease appeared in a tropical form in August and September.

The Soviet Government had undertaken an energetic campaign against malaria. Numerous malaria stations had been organised, and these functioned as centres of anti-malarial activity of all kinds. The principal obstacle to efficient work had been the lack of quinine.

The first period of the activity of the Epidemic Commission might be considered as closed. The special funds placed at its disposal for the accomplishment of certain definite tasks were exhausted. All the activity which it had hitherto displayed would be summarised in a future report. Assistance was still being given to Russia, especially by collaboration with a vaccination Committee of which the Chairman was Dr. Tarassevitch and the secretary Dr. Lubarsky. This Committee was carrying out an enquiry regarding the efficacy of vaccination by mouth.

It was proposed to undertake a retrospective enquiry in the Ukraine into the epidemic of typhus in order to obtain all possible epidemiological information regarding the exceptional outbreak of the disease. As a result of the conversations which Dr. Norman White had had with many Russian doctors, it appeared that the cases of persons being attacked more than once by the disease were more numerous than was generally believed.

The PRESIDENT, in the name of the Committee, thanked Dr. Norman White for his summary

Dr. NOCHT asked Dr. Norman White whether the disease which attacked the camels in the Ukraine and in the Kirghiz Republic was not a form of trypanosomiasis.

Dr. Norman WHITE replied that cases had been reported from there.

Dr. CHODZKO, in the name of the Polish Government, thanked Dr. Norman White and the Epidemic Commission for the valuable assistance they had given to Poland in defending her against the epidemics, and also to Eastern Europe.

The statement by Dr. Norman White concerning the health situation in Russia appeared to him to be somewhat optimistic. The figures which appeared in *Epidemiological Bulletin* No. 62 proved that the number of cases of typhus and relapsing fever recorded in Russia up to September 1st, 1923, were practically identical: 193,000 cases and 190,000 cases. The state of affairs shown by these figures did not correspond to that which had existed in Poland at the same time, when, for the first six months of 1923, 9,251 cases of typhus and 1,779 cases of relapsing fever were recorded.

The figures concerning Roumania proved that, from the point of view of the incidence of these two diseases, the situation had not sensibly improved. If the fact that an epidemic of malaria was raging in Russia were also taken into account, and that that epidemic was more widespread than usual, it could not be maintained that the health situation of that country was definitely assured, all the more so as, before the war also, the course of epidemics in Russia tended to follow a rather undulating curve. In these circumstances, the health and hospital installations set up in Poland with the aid of the League of Nations and its Epidemic Commission were of particular value not only for Poland but for the whole of Europe, and great emphasis should be laid on the part played in their establishment by Dr. Rajchman and Dr. Norman White.

Sir George BUCHANAN wondered what confidence could be placed in statistics concerning malaria in Russia. Even in countries where, as in Great Britain, the statistical service was very well organised, it was difficult to obtain correct and complete information.

Dr. Norman White had mentioned a retrospective enquiry to be held on the typhus epidemic. It appeared to him that it would be very difficult to bring such a proposal to a successful conclusion. It recalled endeavours which had been made in Great Britain to hold a retrospective enquiry into the influenza pandemic a few months after it had ceased. The results of this enquiry had been published by the Ministry of Health. It was only with great difficulty that information had been collected, and it had been necessary to have recourse to the best medical officers of health and to select the typical districts with the greatest care. Even then, reconstruction of facts as to first and second attacks, immunity, and so forth, was often extremely uncertain. Were it desired to undertake a similar enquiry in Russia, and to get reliable information for epidemiological science, the expenditure incurred would be great and might be more usefully employed for other objects. Endeavours might be made more profitably to discover the causes and nature of the plague epidemic which had recently broken out amongst the Kirghiz in the Kalmuk and Astrakhan districts.

He asked from what source sums were available for this kind of work. Were they to come out of the 50,000 francs voted by the Assembly to which the Medical Director referred in his report ?

He was very happy to learn that, now that the Epidemic Commission was practically at the end of its work, Dr. Norman White contemplated preparing a general report on the activity of the Epidemic Commission and on the employment of the special funds placed at its disposal for definite tasks.

The Medical Director's report stated that the members of the Epidemic Commission were at present engaged on work in the Health Section for which they were individually particularly competent. Did the Epidemic Commission now comprise any other member than Dr. Norman White ?

Dr. RAJCHMAN explained that the Ukrainian authorities had undertaken a retrospective enquiry into the typhus epidemic, and it would be a useful step to complete that enquiry and make it more methodical and more complete. To this end some small financial support would be sufficient. The Health Section would certainly endeavour to obtain all possible information on the situation caused by the plague centre and on the epidemiological situation in general.

The activity of the Epidemic Commission was assured by special funds voted by some governments. Thanks to the initiative taken by Sir George Buchanan in May 1923 the Provisional Health Committee had sent a request to the Council that a sum should permanently be placed at its disposal. The Council had sent this request to the fourth Assembly, which had twice discussed it. The Second Committee of the Assembly had been ready to satisfy the Health Committee, and on the proposal of the Fourth Committee of the Assembly it had been decided that the Council could draw on the item of the Budget "Unforeseen Expenses" for sums in case of emergency, provided that the epidemic were likely to give rise to consequences which were political in nature. Further, the Assembly had voted a sum of 50,000 francs for enquiries on epidemics.

The number of members of the Epidemic Commission had varied. The Epidemic Commission had at first consisted of only one member and was no larger to-day.

Professor OTTOLENGHI raised the question of vaccination by mouth which was referred to in Colonel Gauthier's report. Colonel Gauthier had recognised that the experiments which had been made had given very interesting results. His report, nevertheless, might be completed, for he did not make sufficient mention of the details of the preparation of the vaccine, nor did he give sufficient information to remove all doubt as to the efficacy of that kind of vaccination. The only legitimate conclusion was that his experiments had been very favourable but not conclusive.

Professor Ottolenghi himself had carried out experiments in a Tuscan village and had obtained modest but favourable results. The experiments might with great profit be continued as thoroughly as possible, and he thought that the Committee ought to take some action in this sense.

Dr. Norman White had referred to cases of typhus in which the same person was attacked several times. Dr. Ottolenghi recalled the fact that experiments which he had personally carried out on guinea-pigs several years previously had provided similar cases. A guinea-pig once cured of typhus was not always immune from a second inoculation of the virus.

With regard to the seasonal curves for malaria, the figures obtained would show that in Russia malaria appeared in the spring in a benign form, and in a tropical form about the end of the summer. This was a well-known fact in the epidemiology of the disease, and consequently the Committee could place a certain amount of trust in the statistics concerning Russia which Dr. Norman White had laid before it.

Dr. RAJCHMAN recalled the fact that, with regard to vaccination by mouth, the Provisional Health Committee, in January 1923, had not desired to assume the responsibility for carrying out experiments on Greek refugees. It had instructed a member of the Epidemic Commission to collaborate with the Greek Government, which had assumed this responsibility, and to carry out scientific observations on the result of the methods employed.

On the other hand, the Provisional Health Committee, at the request of the Soviet Health Commissaire, had placed an expert at the disposal of the Soviet Government to collaborate with the Committee of Russian scientists who were conducting experiments in vaccination by the mouth against cholera. The experiments had been carried out under scientific conditions, and the necessary vaccine was prepared in Paris. With regard, however, to typhoid fever, experiments could scarcely be of the same scientific nature in view of the fact that this disease was endemic in the country. Experiments with regard to dysentery had given very interesting results. They had been carried out notably in asylums and closed institutions allowing of careful control of their inmates.

Professor Léon BERNARD thought that it would be of great interest to know the effects of vaccination by mouth, especially in regard to typhoid. In France, anti-typhoid vaccination was obligatory for the army, but, unfortunately, encountered great opposition amongst the civil population. It was noticed that, since the war, typhoid fever among adults was particularly prevalent in the female element of the civil population, and from this the conclusion had been drawn that the men were protected, thanks to the vaccination which they had undergone during the war when serving in the army.

If the experiments carried out in Greece were not very conclusive, an endeavour should be made to obtain all the information possible about the experiments conducted in Russia. The fact that a disease was endemic in a country in no way diminished the value of a vaccination

experiment. Typhoid diseases had existed in an endemic state in the French army at the front from October 1914. The mortality from this disease rose to 25 per cent. The epidemic had been stamped out by means of vaccination as early as 1915. It had practically ceased by the end of the war in 1918. Though the disease was endemic it had been eradicated by means of vaccination. In France, scientific circles did not appear to be greatly in favour of vaccination by mouth. It would, therefore, be very interesting to collect any information of value on the effects of this kind of vaccination.

Dr. LUTRARIO explained how carefully the incidence of malaria was studied in Italy. Observation of the disease had been carried out among troops and sailors, miners, railway workers, etc., and the Red Cross was displaying great activity. By means of interpolation it was possible to draw up statistics sufficiently accurate and so closely approaching the truth that it was a sufficiently exact curve of spring-time morbidity could be prepared as well as that for the summer and autumn.

Dr. PITTALUGA recalled the fact that vaccination against typhoid was obligatory in the Spanish army and that the best results had been obtained among the Moroccan troops. It was, unfortunately, difficult to induce the civilian population to be vaccinated. In Catalonia, nevertheless, the whole population of certain small towns had accepted prophylactic vaccination. T.A.B. vaccine had been used. In a small town of 2,000 inhabitants, Pont de Vilumara, where the water was impure, everyone had been vaccinated and the results had been admirable. Very delicate experiments of vaccination by mouth were being prepared in several villages in the same district. The results would be communicated at a future date. A breeding ground of relapsing fever had been discovered for the first time in Spain in Upper Estremadure (province of Caceres); eight cases had been registered. Research work, from the etiological and epidemiological aspects, was being carried out on this form of spirochætosis.

Dr. JITTA informed the Committee that some time ago a typhoid-fever centre had been found in a small place in the Netherlands due to the contamination of milk. Systematic vaccination of the inhabitants of the infected village resulted in the disappearance of the epidemic, which had not been sufficiently reduced by the ordinary methods.

In the Netherlands, malarial epidemics occurred in the spring. It would be interesting to know the causes of the epidemic which had broken out in Russia in September.

Dr. RAJCHMAN pointed out to Professor Léon Bernard that it seemed that experiments in regard to typhoid diseases would necessarily be less conclusive than experiments regarding other diseases, for numerous factors had to be taken into consideration when a disease was endemic in a country. He was very glad to note that the Committee desired to encourage further research in this direction, and he would do his best to collect all the available information regarding experiments carried out under trustworthy conditions in Russia and elsewhere.

Dr. Norman WHITE pointed out to Dr. Chodzko that the statistics in the *Epidemiological Report* to which he had referred were not of very recent date; they would have to be completed by the latest information which had come to hand. He drew attention to the fact that the progress recently made by the Health Administration in Russia was very marked.

With reference to the value of statistics concerning malaria, it should be recognised that they were not perfectly accurate but that this was also the case before the war. Statistics, both before and after the war, were comparable. The cases reported were chiefly those which attended civil dispensaries and hospitals and similar institutions belonging to the waterways and railways departments. Generally speaking, it could be said that the statistics available gave a sufficiently accurate picture of the situation.

19. Appointment of a Sub-Committee to prepare a Resolution on the Work of the Epidemic Commission.

On the proposal of the PRESIDENT, *it was decided that a small sub-committee should be appointed to draw up a draft resolution on the work of the Epidemic Commission.* The Sub-Committee was constituted as follows:

Professor Léon BERNARD, Sir George BUCHANAN, Dr. CHODZKO, Professor OTTOLENGHI, Professor PITTALUGA.

20. Report of the Opium Mixed Sub-Committee. Legitimate requirements of Raw Opium.

Dr. CARRIÈRE submitted a report on the work of the Opium Mixed Sub-Committee and commented briefly on the report (Annex 3). He reminded the members that this Mixed Sub-Committee had been set up by the Provisional Health Committee and the Advisory Committee on the Traffic in Opium to investigate such medical and scientific questions as the Advisory Committee might consider it desirable to submit to it.

The first undertaking entrusted to the Mixed Sub-Committee had been the determination of the legitimate requirements of a country in regard to drugs. The Mixed Sub-Committee had had to consider in the first place the meaning of the expression "legitimate requirements"; the majority of the Sub-Committee, as his hearers were already aware, were of the opinion that

medical and scientific requirements were alone to be regarded as legitimate, and that this principle should be taken as the basis for its investigations. The representative of British India, however, had dissented from this view and had formulated express reservations.

This matter being settled, a method of investigation had had first of all to be discovered which would give data that could be used. The method finally adopted consisted in applying direct to hospitals, pharmacists and practitioners (doctors, dentists, veterinary surgeons), the information thus collected being checked by particulars obtained from sick insurance funds. Enquiries of this nature had already been carried out, and the results obtained were summarised in the tables submitted to the Committee.

It should also be stated that the Mixed Sub-Committee had secured for its investigations the services of Professor Knaffl-Lenz, an eminent specialist, and the speaker desired to thank him for his invaluable assistance.

The Mixed Sub-Committee had reached the conclusion — which, in point of fact, was not unforeseen — that it would be difficult, if not impossible, to give figures, even if they were only approximate, which would represent the legitimate requirements of countries in regard to narcotics. The enormous discrepancies shown in the returns made by certain countries gave ample evidence of this. For example, Canada asked for 610 milligrammes, and New Zealand 510. At the other end of the scale came Latvia with 11 milligrammes, whereas Finland, a country bordering on Latvia and in which the conditions could not be very different, desired 325 milligrammes. These few cases brought out the extreme difficulty of the problem.

After lengthy discussions the Mixed Sub-Committee recognised that it was impossible to fix the amount precisely and that it would have to accept a compromise. It therefore agreed on the figure of 600 milligrammes of raw opium per year per person — an amount arrived at in a more or less empirical manner on the basis of the information already collected. This figure was undoubtedly a very liberal estimate. The previously mentioned method of checking the figures by means of the data supplied by sick insurance funds, which could be regarded as the most reliable source of information, had given much lower figures for Vienna and Basle, *i.e.*, 230 and 240 milligrammes respectively. The close agreement between these figures appeared to strengthen their value, for certain purposes at least; it was necessary to recognise, however, that the figures could not be taken as final, since they related to certain classes of the population only, namely, those who were members of sick insurance funds.

The amount of 600 milligrammes, accordingly, represented a compromise which it appeared necessary to accept provisionally so as to enable the Mixed Sub-Committee to reply to the definite question which had been put to it. In order to define the position and to limit the significance of this figure, it should be pointed out that it was principally intended to furnish the conferences which were to be held in 1924 with a basis for their discussions on one of the questions with which they would have to deal, namely: the reduction of the world output of opium. That, however, could only be a starting point, a first step. It was to be hoped that as and when more exact information was secured and the investigations gave more accurate results the first reduction — which might be described as an empirical reduction — would be followed by further reductions effected on more scientific lines; thus the world output of opium would gradually be reduced to the minimum required for legitimate purposes.

The PRESIDENT pointed out that the figures for Denmark and Sweden, 410 and 420 milligrammes, were definite. A new enquiry had been undertaken in Denmark.

M. VELGHE said that the figure of 250 milligrammes for Belgium must also be considered as definite. If a comparison were made between this figure and the figures for Denmark and Sweden, the maximum figure of 600 milligrammes adopted by the Mixed Committee appeared excessive.

Further enquiries would furnish the additional information desirable. At the moment the Committee could only resign itself to accepting the figure of 600 milligrammes, while making very definite reserves.

Dr. KNAFFL-LENZ explained that the figures in the tables had been supplied by Governments, but they did not always include codeine. They were not mutually comparable. In Vienna, for example, twice as much codeine was employed as at Basle. The maximum figure ought not to be too low, for provision would have to be made for epidemics. He himself proposed the figure of 450 milligrammes, and the figure of 600 milligrammes had only been adopted to give satisfaction to the representative of British India.

M. KUSAMA pointed out that the figures to be found in the tables applied to Europe and to the American States. It was an open question as to the degree to which they could be applied to Asiatic and Far Eastern countries.

Professor Léon BERNARD thought that the explanations given by Dr. Knaffl-Lenz had proved the relative nature of the figures furnished by Governments. It seemed to him to be dangerous, in these circumstances, to fix a maximum and a minimum.

If it were necessary to fix a figure, it should be understood that that figure was only for the sake of comparison and that every effort should be made to get below it.

Sir George BUCHANAN agreed with M. Kusama. The Health Committee had been requested to give an approximate indication of legitimate needs, which it interpreted in the sense of medical needs.

This figure was required to represent general consumption in the world. The Mixed Sub-Committee had made a rough estimate of such a figure and had placed it at 600 milligrammes Let the Committee refer to this as a very rough guess, while pointing out that the data had been

obtained from specified countries only. But reference should also be made to the figures for the individual countries, and it should be stated in each case how the figures had been obtained.

He asked whether the report of the Mixed Sub-Committee could not be sent to the Council as a report agreed to by certain members of the Health Committee, but for which the Health Committee was not itself responsible.

M. BLANCO, member of the Opium Section of the Secretariat, recalled the fact that a conference on opium was to meet in November 1924. Its object would be to determine the quantities of opium necessary for medicinal and scientific purposes. It appeared that the only way to define these was to fix an average figure per head which should be approximate and provisional. This figure would be multiplied by the population of those regions of the world where opium was used for medicinal and scientific purposes. The figure, if adopted, would enable a step forward to be taken; without it the Conference would be unable to apply certain articles of the Opium Convention.

M. VELGHE thought that the Health Committee should be careful not to go outside the bounds of its programme. It seemed strange, at any rate to him, that an average and approximate figure obtained from certain European countries should be multiplied by the figure of an undetermined population. This was a very round-about method, he thought, of reaching the desired end. This, however, was not the question. The Committee had been asked for a figure, and a definite reply must be given without entering into the considerations suggested by Sir George Buchanan. What were the legitimate needs of peoples regarding which statistics were available? The Committee had before it two extreme figures. The figure furnished by Denmark and Sweden was about 400 milligrammes, while the Mixed Sub-Committee had adopted the figure of 600 milligrammes. Judging from the figures given by fifteen countries out of twenty, the Health Committee ought to be in a position to say that the figure of 600 milligrammes was far too high and that it only accepted it provisionally as a first step towards the limitation of production.

Professor Léon BERNARD said that, after the explanations to which the Committee had listened, he would withdraw his proposal to the effect that no figure should be adopted. He asked, however, why the Health Committee should adopt the figure of 600 milligrammes while at the same time maintaining that it was too high. He feared lest the figure, once fixed, should not be forgotten and would come to be considered as the normal one.

M. VELGHE pointed out that it was the Mixed Sub-Committee which had fixed the figure of 600 milligrammes. The opinion of the Health Committee on this figure had been asked for and it would reply that the figure was too high.

Sir George BUCHANAN said that he had never been able to understand the use of a system of mixed committees. When two departments were interested in a question one should be the responsible department and the other should be the consulting body. There would be no objection to a Mixed Sub-Committee as adviser to one or the other technical organisation, but it seemed bad administration to require both to approve. No one knew where responsibility rested. It was for this reason that he had proposed that the Health Committee should send all the figures that had been collected to the Advisory Committee on Opium and leave that body to take the decision.

Dr. RAJCHMAN recalled the fact that the Health Committee had full liberty of action. A Mixed Sub-Committee had been appointed because the Advisory Committee on Opium had begun a discussion on questions of a medical description which had necessitated the collaboration of the Health Committee. The Minutes of the Mixed Sub-Committee had been submitted both to the Advisory Committee and to the Health Committee and had been considered as confidential until approved by the Health Committee.

Dr. CARRIÈRE said that he was anxious to bring out clearly the fact that the report which he had submitted came from the Mixed Sub-Committee. That report had already been submitted to the Advisory Committee on the Traffic in Opium and was to be presented to the Health Committee. The latter body, however, retained full freedom of action and could pass any criticism it thought desirable on the findings of the report.

To shorten the discussion he requested the Committee to empower him to prepare a draft resolution which would take into consideration the various objections put forward and which would be submitted to the Committee at its next meeting.

This proposal was adopted.

FOURTH MEETING

Held on Thursday, February 14th, 1924, at 10 a.m.

Dr. MADSEN in the chair.

21. Approval of the Minutes of the Second Meeting.

The Minutes of the second meeting were adopted, subject to certain amendments submitted by members of the Committee.

22. Report of the Medical Director: Epidemiological Questions and Special International Problems of Public Health.

Chapter 2 of the Medical Director's report was read (Annex 2).

Sir George BUCHANAN asked whether members were at liberty to discuss not only the report of the Medical Director but also the report of Mr. Sydenstricker, (Annex 5) head of the Epidemiological Intelligence Service.

Dr. RAJCHMAN explained that this report was of the nature of a general summary, while the report of Mr. Sydenstricker, which had been distributed to the Committee at the beginning of January, gave details of the various questions.

The PRESIDENT called on members to express their views on the two reports.

Sir George BUCHANAN recalled the fact that even before the existence of the Health Section of the League he had drawn attention to the great advantage of building up a good international intelligence service regarding infectious diseases, and had also indicated the directions in which efforts should be made to harmonise the vital statistics of different countries.

Thus, he was the more happy to note the progress which had been made and to have been able, through his colleagues at the British Ministry of Health, to assist in the work by placing at the disposal of the Health Section the facts and knowledge available in the department under his charge. The Health Section of the Secretariat, in accordance with the instructions of the Provisional Health Committee, had during the last two years adopted a system of experimentation — consultation with all sorts of authorities and experts, issuing reports, holding statistical conferences and so on— in order to find out what would be the best way in which to carry on the work in its final form.

The period when it was possible to make concrete proposals had now arrived and the two reports referred to many lines of work on which some experience had been gained. Each of them demanded close examination, and the totality of the work should also be considered. To do this now would mean too great an entry into detail. The best procedure would perhaps be to remit to the Sub-Committee, which he understood the President intended to propose, the duty of suggesting methods to co-ordinate the various proposals for the future, to introduce stability into the future work and, in a word, to prepare a definite programme of action, taking account in all cases of the broad lines of policy and the principles which should govern the work.

On the proposal of the PRESIDENT, *it was decided to appoint a sub-committee, composed of Sir George Buchanan, Dr. Jitta, M. Velghe, Dr. Raynaud and Dr. Carrière, to consider the chapter of the Medical Director's report and the report of Mr. Sydenstricker on the Service of Epidemiological Intelligence and Public Health Statistics.*

23. Interchange of Public Health Personnel: Report of the Sub-Committee on the Elaboration of a General Plan for Interchanges.

Professor Léon BERNARD (Rapporteur) recalled the fact that the Sub-Committee had been instructed, in order not to lose time, to prepare a general plan for the system of interchanges, taking as a basis the report of the Medical Director and the observations on it made by the members of the Committee. He then read the report of the Sub-Committee (Annex 6).

Certain observations were made by members of the Committee regarding the report, especially with reference to (*a*) the question of the publication of special reports and (*b*) the organisation of interchange visits for groups of factory inspectors.

(a) *Publication of Special Reports.*

Sir George BUCHANAN was of opinion that it would be prudent to omit the sentence which appeared to place the duty of sanctioning the publications solely on the Health Section.

The Committee approved this point of view.

Dr. RAJCHMAN wondered if it were possible entirely to forbid persons taking part in an interchange visit to publish special reports on their visit without the consent of the health administration to which they belonged.

M. VELGHE pointed out that, in Belgium, officials had full liberty except in the case of work done with the assistance of administrative documents.

Dr. CARRIÈRE was of opinion, as he had pointed out at a previous meeting, that health administrations ought to have the right of censorship on the publications of those of their officials sent on missions to other countries. He personally would not hesitate to warn the officials he would send to take part in the interchanges that they should publish nothing concerning those interchanges without first submitting it to him.

Dr. LUTRARIO insisted on the right of a health administration to impose a certain reserve on the publications of its officials.

Dr. PITTALUGA thought that a distinction should be drawn between authentic reports which would have to be submitted for the approval of the official's immediate chief and the publication of personal opinions in the scientific Press. This latter form of publication ought to be without control. It must be borne in mind that opinions which might sometimes wound the susceptibilities of health administrations were indirectly of use in making progress in the organisation of those services.

Dr. CARROZZI said that factory inspectors experienced great difficulty in entering factories, and it was indispensable that control should be exercised on the publication of the views of these inspectors.

Dr. PITTALUGA thought that in such cases it was, above all, important to choose the right people.

M. VELGHE pointed out that each Government was free to take such steps as it thought fit to control the publications of its own officials, and that the Health Organisation of the League had therefore no grounds for intervening in this matter.

Dr. LUTRARIO was of the contrary opinion. The League of Nations should be careful to guard against the occurrence of any incidents or misunderstandings between Members of the League. Such incidents might follow the publication of the findings and expressions of opinion which might be somewhat imprudent by a young inexperienced official. For this reason he insisted on his earlier observation.

Dr. RAJCHMAN said that persons taking part in interchange visits were in no way representatives of their country.

Sir George BUCHANAN inclined on the whole to Dr. Lutrario's view. The Health Committee should be very careful to see that the publications of persons participating in an interchange visit did not compromise the spirit of friendship which should exist between the Members of the League. He suggested that the member of the Health Section who took part in the interchange visit should draw the attention of those participating in the visit to the danger of publishing ill-considered opinions.

In conclusion, the following text was adopted:

> "It is undesirable that these reports should be published by the authors without the consent of the health administration to which they belong."

(b) *Organisation of Interchange Visits of Groups of Factory Inspectors.*

Dr. CAROZZI thought that the expression "factory inspectors" should be more clearly defined since it did not possess the same meaning in all countries.

Professor Léon BERNARD explained that the expression chosen had a very general meaning and covered not only doctors but any officials dealing with industrial hygiene.

On the proposal of Dr. RAJCHMAN, *it was decided to use the same words as those employed by M. Albert Thomas in his letter to the Committee:*

> "Groups of doctors, inspectors of factories and of labour officials belonging to a central or professional labour inspection office, who are specialists in industrial health and pathology."

On the proposal of Sir George BUCHANAN, *it was decided to make no distinction between large and small countries.*

The report of the Sub-Committee, thus amended, was adopted, with the reservation that the English text should be revised by English-speaking members of the Committee.

24. **Report of the Opium Mixed Sub-Committee: Legitimate requirements of Raw Opium** *(continuation of the discussion).*

Dr. CARRIÈRE presented the following draft resolution:

> "The Health Committee,
>
> "Having noted a report on the work of the Opium Mixed Sub-Committee and the investigations it has made in order to determine the legitimate needs of the countries in respect of narcotics, it being understood that by legitimate needs is meant needs for medical and scientific purposes;
>
> "Having further noted that the figure of 600 milligrammes of raw opium per head per annum proposed provisionally and as a compromise by the Mixed Sub-Committee is notably higher than the figures indicated in the case of countries which have a strictly regulated system of control and than the figures furnished by certain precise investigations, in which cases the figure varies between 250 and 450 milligrammes:
>
> "Declares that it cannot adopt the figure proposed by the Mixed Sub-Committee, which it considers as appreciably in excess of the quantities necessary for legitimate needs, and proposes that this figure should be reduced to 450 milligrammes."

The Health Committee might have confined itself to rejecting the figure of 600 milligrammes, which it found too high, and gone no further. Since, however, the Opium Mixed Sub-Committee had been asked to fix a figure which might serve as a basis for the work of the coming Opium Conference, it seemed necessary to give some indication of that figure. The Committee might adopt as a maximum the figure of 450 milligrammes which was based upon the various statistics which had been collected. It seemed, on the other hand, from a rapid analysis which Professor Knaffl-Lenz had made of statistics just received and relating to some British colonies in Africa that this figure of 450 milligrammes was clearly too high, particularly for certain countries of Africa. He therefore proposed to add the following words to the draft resolution:

> "The Health Committee emphasises, however, that the figure which it proposes is not one universally applicable, and that for certain countries of Africa, for example, it should be considerably reduced."

Professor KNAFFL-LENZ said that the figure of 450 milligrammes was not applicable to all parts of the world. Statistics for the British colonies of Africa gave an average figure of 24 milligrammes. If the figure of 450 milligrammes, which was itself fairly high for the whole world, was adopted, the annual production would be ten times greater than the legitimate needs. He suggested that the figure of 450 milligrammes should be adopted for Europe, and from 40 to 50 milligrammes for Africa.

Professor Léon BERNARD thanked Dr. Carrière for having prepared a new draft resolution, but, as health experts, the members of the Committee must be careful to give a scientific opinion so that their responsibility as men of science might not be involved. From the scientific point of view there was no possible reply to the question which had been put. The problem was merely to fix an approximate figure in order to help the Advisory Committee on the Traffic in Opium. The figure of 450 milligrammes was still too high, as was shown by the explanations of Professor Knaffl-Lenz. As the question before the Committee did not only apply to the countries of Europe, the Committee must formulate a reservation regarding the application of this figure to other parts of the world. The figure fixed could not be considered as a co-efficient for all countries. Account must be taken of the origin of the statistics collected, of the various conditions prevailing in different countries and of the fact that consumption would increase during periods when there were epidemics. All these considerations should figure in the reply of the Committee, which should adopt the lowest possible figure with an express stipulation that it could only be considered as a co-efficient applying to civilised countries where medical assistance was regularly organised.

M. VELGHE said he approved the observations of Professor Léon Bernard but remarked that the new draft resolution proposed by Dr. Carrière corresponded with the first conclusion reached by the Mixed Sub-Committee. The figure of 450 milligrammes might be retained, for it came very near to the figures furnished by Sweden and Denmark. If the Committee adopted a lower figure it might be reproached with having fixed this figure in an arbitrary manner. It must be stated, however, that the figure of 450 milligrammes was a maximum and provisional figure and that it was calculated according to the statistics of some fifteen countries, whereas the needs of the other countries of the world remained completely unknown.

Sir George BUCHANAN said that, if he rightly understood M. Velghe, it was proposed to take Dr. Carrière's draft resolution as a basis and to modify and revise it in the Sub-Committee. He was in favour of this procedure.

He approved the observations of Professor Léon Bernard, but said he would like to remind the Committee how the question had arisen. A Mixed Sub-Committee of the Provisional Health Committee and the Advisory Committee on the Traffic in Opium had conducted a wide enquiry in civilised countries. The statistics which had been collected might perhaps be utilised for such countries, but the Advisory Committee on the Traffic in Opium asked for a figure which would be applicable to the whole world. The figure of 450 milligrammes was perhaps a better approximation than that of 600 milligrammes, but care must be taken not to deprive it of its approximate and relative character. It was essential that the figure should not be fixed too low on the pretext that there were abuses, for it was important to remember that in this matter the Health Committee

was, in a sense, the trustee for a multitude of persons in pain and suffering from whom it would be cruel to withhold a most valuable remedy. The Health Committee therefore might reply to the effect that it had studied the report of the Mixed Sub-Committee, and it should draw attention to the countries in which the statistics had been collected and the ways in which they had been obtained. The Committee might state, in conclusion, that, as a general figure had been requested, the figure of 600 milligrammes appeared to be very roughly approximate, though probably too high, while the figure of 450 milligrammes was probably nearer the truth.

Dr. PITTALUGA noted that the members of the Committee were almost unanimous in finding the figure of 450 milligrammes too high. As regarded Spain, the most recent statistics of seizures, the data of which for 1923 had been sent to the Secretariat, showed a notable increase in the smuggling of opium.

He proposed that the draft resolution proposed by Dr. Carrière should be adopted with the addition of the following paragraph:

> "Subject to the reservation that there shall be a further revision, which would certainly result in a lowering of this figure, and which can only be accepted for countries organised from the point of view of medical assistance."

The PRESIDENT feared that the adoption of the figure of 450 milligrammes might be used later as a basis for rationing the countries.

M. BLANCO, member of the Opium Section of the Secretariat, said that the sole object of the figure requested was to facilitate further investigations. The question of rationing had not yet arisen. For the moment, it was merely proposed to estimate the legitimate needs of the various parts of the world. As for the proposals which the Conference of November 1924 might make, the Governments would act on receipt of them as they would judge best.

The PRESIDENT emphasised the fact that Denmark and other countries had furnished a figure which was very approximate to 450 milligrammes and that these countries must contemplate an increase of their legitimate needs in the event of epidemics.

M. KUSAMA agreed with the observations made by M. Velghe and Sir George Buchanan. He was not concerned with the exact figure which should be adopted, whether 450 or 600 milligrammes. What did concern him was the procedure of the Committee as formulated in the resolution. In the absence of figures from the Orient he could not accept the proposal to determine the quantity of opium needed there from the figures returned from the European and American countries. When the Health Committee expressed its opinion on a certain figure it should exactly state its source and the means by which the Committee arrived at its conclusion so that it would be fairly convincing when presented to the countries which were interested in the question and which relied on the expert opinion of the Committee.

M. VELGHE thought that Sir George Buchanan was mistaken in considering the figures of 450 and 600 milligrammes as equal by approximate. The figure of 600 milligrammes had no basis whatever, whereas the figure of 450 milligrammes was based on trustworthy statistics. The Health Committee could not accept the compromise suggested by the Mixed Sub-Committee. On the contrary, it could accept the figure of 450 milligrammes if it were regarded as a provisional maximum for certain countries. In this way the Health Committee would be able to prevent the Advisory Committee on the Traffic in Opium from committing itself to dangerous courses.

Dr. CHODZKO thought that Asia was the great unknown. The Health Committee could perhaps fix a figure for organised countries to cover the case of medical aid, and another figure for Africa and other parts of the world. With regard to Asia, the Health Committee could perhaps express its astonishment that it had not been able to obtain any figures for Japan. It might ask the Advisory Committee on the Traffic in Opium to collect figures, which ought to be fairly easy to obtain in the case of India, Japan and the French and Dutch colonies. This would be a first step while waiting for information on China, Persia and Turkey, which were large producers of opium.

Dr. MIMFELA hoped that replies would not be long in arriving from Latin America, to which, he presumed, a questionnaire had been sent. With regard to Peru, he accepted the maximum figure of 450 milligrammes, which was even too high, for Peru produced and consumed coca leaves, which meant that its imports of opium were less.

Professor Léon BERNARD said that he was much struck by the contrast between the gravity of the question and the scepticism shown by most members of the Committee and by the experts, who disputed the value of statistics and the use to which they could be put, and who appeared to think that the proposed conferences would not achieve any great result owing to the fact that it appeared unlikely that States would care to limit their production. Whatever reservations the Health Committee might formulate, one result of its studies would remain, and that was the fact that medical men had agreed to the figure of 450 milligrammes. It could but be regretted that, after so much good endeavour to find a figure, the only figure which had been found possessed no scientific character and might lead to dangerous results.

It would be better for them to say to the Opium Committee: "We can give no reply to the question before us, for it is not possible scientifically to fix the figure for legitimate consumption. It is not by this means that you will attain the desired goal. It would be better, in order to put a stop to the spread of this abuse, to recommend the States to take such police measures as they deemed desirable and to undertake the necessary propaganda in order to enlighten public opinion".

In a word, the Health Committee ought to reply to the question raised by the Advisory Committee on the Traffic in Opium by stating that it would be best to change the method of attaining the end and to discontinue searching for a figure which could have no real value. This would be

more in conformity with scientific accuracy and the conclusions to be drawn from the debates. Nevertheless, if the Committee was quite determined to fix a figure, it was essential that a new text should be prepared containing definite reserves which would express the considerations put forward.

Sir George BUCHANAN said that it was impossible to remain insensible to the appeal of Professor Léon Bernard. It confirmed his distrust of the system of Mixed Committees. It would have been better if the Advisory Committee on the Traffic in Opium — the responsible body — had obtained its medical advice through two or three experts indicated by the Health Committee, the latter body remaining free from any responsibility. Nevertheless, it hardly seemed possible at the moment to go back on what had been done. The text proposed by Dr. Carrière might, therefore, be accepted as a basis and revised, taking into account the observations which had been made by Professor Léon Bernard, and be proceded by a preamble in which a reservation would be formulated. A paragraph might be also added to the text pointing out that the investigation had been limited to certain countries, and the resolution might conclude with the paragraph suggested by Dr. Pittaluga.

Referring to the observations of M. Velghe, he thought that, while the figure of 450 milligrammes had some sort of medical basis, it was none the less a very rough indication. It was probably a nearer estimate than the figure of 600 milligrammes.

Dr. RAJCHMAN recognised that the Governments which would take part in the Opium Conference would not be bound by the conclusions of the Health Committee. Professor Léon Bernard, however, appeared to be too pessimistic. An important step had been taken at the time of the last Assembly of the League of Nations. Two international conferences would meet in 1924, which would certainly result in a more effective control of the opium traffic. An attempt would be made to limit the production and to control the manufacture — a twofold intention which explained how the Advisory Committee on Traffic in Opium had been led to ask that a figure should be fixed. It would be extremely dangerous to go back on what had been already done, for the Committee would thereby run the risk of giving the impression that the limitation of production, which was the object in view, was not attainable.

Professor KNAFFL-LENZ, replying to M. Kusama, said that, if the statistics were relative, the figures furnished by the insurance companies of Basle and Vienna were, on the contrary, scientifically determined.

Dr. CHODZKO, replying to Professor Léon Bernard, said that practical considerations should be kept in mind. The fixing of a figure even approximative, and even though it were too high, marked a step in advance. Account must also be taken of the interest shown by the United States of America in the questions of opium and morphia. Even health specialists must not be afraid of looking at the matter from the practical point of view when dealing with questions in which progress could only be made gradually.

M. KUSAMA said he desired to remove any misunderstanding. He had not intended to throw any doubt upon the figures which had been collected. All he had intended to say was that the statistics which had been collected in Europe were not valid for the Asiatic countries, which had not furnished statistics. He was prepared to accept the text proposed by Sir George Buchanan.

Professor Léon BERNARD said that he did not dream of leaving practical considerations out of account. He reminded the Committee that, on the contrary, he had contemplated measures of police control and legislative measures. He asked whether the fixing of a figure would assist in limiting production.

Dr. RAJCHMAN replied that the present production was estimated at 3,000 tons. If the average figure of 450 milligrammes was multiplied by the figure which represented the population of the world, the result would be a figure of 720 tons, which represented legitimate needs.

Dr. CARRIÈRE observed that the Provisional Health Committee had approved the appointment of a Mixed Sub-Committee to determine the quantities of raw opium required to meet legitimate needs. The Mixed Sub-Committee had carried out an enquiry and collected figures. The report and conclusions which it had submitted were open to discussion, but it seemed undesirable to make a retrograde step; he therefore could not give his support to the extreme suggestion made by Professor Léon Bernard. Personally, he had never entertained illusions as to the value of these enquiries, but he thought that when an enquiry had been made it was impossible completely to disregard it. It was therefore necessary to draw attention, subject to all reserves, to the facts which appeared to result from an enquiry. As regarded the figures before the Committee, he had always been of opinion that they ought to be employed solely with a view to considering the possibility of a reduction in the world production of opium and not for rationing countries. Dr. Rajchman had just said that a reduction based upon the figure of 450 milligrammes would reduce the production from 3,000 tons to 720 tons; that would undoubtedly be a valuable result.

He proposed the following text which had been drawn up with a view to meeting the objections expressed by the various speakers and which would follow the first three paragraphs of his original draft:

> "The Health Committee considers that at the present stage of investigation the figure corresponding to these needs cannot be precisely established. A figure of 450 milligrammes, however, might be laid down, it being understood that this figure has no absolute value, that it can only be considered as provisional, that it represents in any case a maximum and that, having been established as a consequence of enquiries undertaken in a certain number of European countries only, it must not be considered as a figure to be generally applied."

Professor Léon BERNARD wished to make it clear that he had never thought of criticising the work of the Mixed Sub-Committee. That work was, on the contrary, very remarkable; what was open to criticism was the procedure to which the Health Committee was committed. He proposed that the end which it was desired to attain by fixing a figure should be stated in the reply, this end being to limit production and not to determine the consumption of opium.

Sir George BUCHANAN proposed that the various texts submitted to the Committee should be sent to the Sub-Committee, which should prepare a new text with the assistance of Professor Léon Bernard.

The Committee adopted this proposal.

25. Report of the Opium Mixed Sub-Committee: Heroin.

Dr. CARRIÈRE (Rapporteur) read the passage in his report concerning heroin.

Professor KNAFFL-LENZ said that, for the last forty or fifty years, pharmacologists had always considered that heroin was a very dangerous drug and one with which medical science could dispense. It was sometimes prescribed, for it had not such an evil reputation as morphine, which was, nevertheless, less harmful. The production of heroin had greatly increased in the past year and he thought that its manufacture could be forbidden without inconvenience.

Sir George BUCHANAN asked whether the prohibition of heroin came within the instructions of the Mixed Sub-Committee and whether the Health Committee had any warrant to give an opinion on that question. This did not appear to him to be the case. The Government of the United States of America had put the question of prohibition before the Office international d'hygiène publique for an opinion at its last session, and the Minutes of that session showed that many of the delegates had consulted the medical authorities in their countries and had found them far from unanimous. It had been pointed out that it was impossible to lay down a definite rule. In certain cases heroin was the only drug giving satisfactory results, to the exclusion of all similar drugs. It might therefore well be asked why a drug, upon the value of which some competent medical opinion insisted, should be suppressed. It raised the whole question of professional liberty.

He proposed that the Health Committee should only express an opinion on the question of the legitimate needs of the various countries in narcotics and should put aside the other questions raised in the report of the Mixed Sub-Committee.

Professor KNAFFL-LENZ explained that the Advisory Committee on Traffic in Opium had instructed him to draw up a report on heroin, which had been discussed at the May session of that Committee. He had submitted his report to the Mixed Sub-Committee.

Sir George BUCHANAN asked why the Health Committee should take a decision on all the questions which the Mixed Sub-Committee had thought fit to examine. If a mandate had been given to the Health Committee to advise the League on the whole question of the suppression of the abuse of narcotics, it would have undertaken a very different kind of enquiry on a large scale, but, as a fact, the question submitted to it by the Opium Advisory Committee had no concern at all with administrative action.

Dr. CARRIÈRE explained that a report by Professor Knaffl-Lenz had been laid before the Mixed Sub-Committee That body thought that it would do well not to confine itself to the limited task which had been entrusted to it (the determination of legitimate needs) but to examine the whole report, which raised very interesting questions. As the report had been examined, it seemed desirable to submit the conclusions reached to the two bodies which were interested in the matter, viz., the Advisory Committee on the Traffic in Opium and the Health Committee.

The Health Committee was of course free to discuss these conclusions or merely to take note of them, but it would no doubt be of great interest to the Advisory Committee to know what the Health Committee thought with regard to the various points which arose. As regarded heroin, Dr. Carrière recalled the fact that a suggestion directed towards the prohibition of its manufacture had been put before the various Governments.

Sir George BUCHANAN thought that, if Governments had been approached regarding the question of heroin, their replies should be received before a decision was taken.

M. VELGHE was of opinion that, as the opium question had been submitted to the Health Committee, it was desirable that the Advisory Committee on the Traffic in Opium should profit by the exchange of views which had taken place in the Health Committee regarding all the questions which had been raised.

Dr. CARRIÈRE proposed that the Health Committee should adopt a resolution regarding the legitimate requirements of dangerous drugs and that it should confine itself, as regarded the other questions raised in the Sub-Committee's report, to taking note of the conclusions contained in the report, while adjourning their discussion until its next session. He would, on the following day, after consulting his colleagues on the Opium Sub-Committee, propose a new text for the resolution.

This suggestion was adopted.

FIFTH MEETING

Held on Friday, February 15th, 1924, at 10 a.m.

Dr. MADSEN in the chair.

26. Approval of the Minutes of the Third Meeting.

The Minutes of the third meeting were approved.

27. Report by Dr. Norman White on the Situation in the Far East.

Dr. Norman WHITE presented his report on his mission to the Far East (Document C. H. 130. 1923). He pointed out that this report though extremely voluminous, should have been still longer owing to the very extensive ground which had been covered. He would like to express his warm gratitude for the welcome which he had received everywhere. Thanks to the facilities which had been accorded to him, his difficult mission had been made comparatively easy.

From a practical standpoint the two principal subjects dealt with in his report were the Sanitary Convention for the countries of the Far East and the institution of an international central bureau for epidemiological intelligence in the Far East.

As regarded the Sanitary Convention, he would point out that, although he was responsible for his report on this question, he had been assisted by several collaborators. The authorities of the Straits Settlements and of the Netherlands colonies had, in fact, already prepared a draft Convention.

Dr. de Vogel and Dr. Victor Heiser had given him generous assistance and had put their long experience of the Far Eastern countries at his disposal. Dr. Victor Heiser had come especially from America to spend ten days at Geneva with the object of studying the draft Health Convention and the question of the institution of an office of epidemiological intelligence in the Far East.

The draft Health Convention was a question of interest to the Office international d'hygiène publique. If certain details of this draft were open to discussion, it might be said generally that it was based on a sufficiently exact knowledge of the position in the Far East. He was prepared to furnish any explanations which might be required.

As regarded the institution of a central bureau of epidemiological intelligence in the Far East, the utility of such an office had been universally recognised. It was extremely desirable that all possible information should be collected in the ports and the various countries of the Far East. This information, taken piecemeal, was not of the same importance, but it might very profitably be assembled and considered as a whole.

A long chapter of the report was devoted to plague, because this question was extremely important from the point of view of navigation. In spite of its length, the chapter was no more than a summary of conclusions which he hoped would be carefully studied by the Committee. He had been tempted to deal with the subject completely, but had confined himself to raising questions in order to facilitate a discussion and to enable members of the Committee to give their views in regard to certain matters, some of which were perhaps of a rather revolutionary character.

He hoped that the report would open a new stage in the improvement of conditions in the Far East.

The PRESIDENT thanked Dr. Norman White for his summary and congratulated him on his report, the details of which might give rise to discussion but which certainly constituted a very remarkable piece of work. The revolutionary opinions expressed by Dr. Norman White would have a very practical and scientific effect on the study of plague. In the name of the Health Committee he thanked Dr. Norman White for the manner in which he had fulfilled his mission. The fact that he had carried it out alone had enabled him to make his report individual in character.

The Committee would have to confine itself to a general discussion, for it was impossible to examine so voluminous a report in all its details. As the report, in his opinion, should later be submtted to the Office international d'hygiène publique, it would certainly be discussed in detail there. It should, furthermore, be submitted, for thorough examination, to a Sub-Committee of the Health Committee. Two principal questions to be discussed by the Committee for the moment were the Health Convention for countries of the Far East and the international central bureau for epidemiological intelligence in the Far East.

Professor JORGE congratulated Dr. Norman White on his report, which represented an immense amount of work and contained a collection of documentary evidence which was truly formidable. Dr. Norman White had indeed performed a veritable Odyssey in his travel undertaken to discover means to better the health conditions of the world.

Among the facts and proposals contained in the report, there were some which did not call for immediate discussion. The questions which the Committee would have primarily to discuss were the draft Health Convention, the establishment of an epidemiological intelligence bureau, and, finally, the theory which Dr. Norman White had formed regarding plague.

The examination of the draft Sanitary Convention should be carried out in the first instance by the Office international, and the same procedure should be followed in the case of the theory regarding plague. With regard to the establishment of an epidemiological intelligence bureau, it was necessary for a sub-committee to prepare a draft and submit it to the Health Committee.

He would confine himself for the moment to making certain general remarks on the question of plague, in which he had been obliged to take an interest for a number of years.

According to Dr. Norman White there were two distinct kinds of plague : bubonic and pneumonic. This was neither a new theory nor was it altogether a commonplace. Since Professor Jorge had begun his studies he had always maintained that a distinction should be made between the two kinds of plague. He had expressed this opinion as early as 1919 before the Permanent Committee of the Office international d'hygiène publique; he had also made a statement on pneumonic plague before the Permanent Committee in October 1923, in which, on the basis of his study of several small epidemics — which sometimes furnished the most useful data — he had attenpted to define the present state of the question of the two forms of plague.

In the first place, such duality did not preclude the existence of the specific plague unit to which epidemiology and bacteriology bore definite witness. Dr. Norman White thought that in pneumonic plague there was symbiosis; but symbiosis had never yet been observed, and was a mere hypothesis not based on any concrete facts. A careful study of Dr. Norman White's report led one to suppose that the writer distinguished between the great pneumonic plague of Manchuria and the lesser outbreaks observed elsewhere. Apparently he considered the former to be an entirely new disease, whereas, in point of fact, the pneumonic outbreaks were entirely similar, showed the same graph, the same form of transmission and the same death-rate. The only differences were statistical differences which had absolutely no bearing on the nature of the disease During the pandemic of 1348, for instance, pneumonic plague was very common. Dr Norman White's hypothesis was therefore open to contest, and even must be contested. In his thesis, however, other disputable theories, in this connection, were advanced, and these should be subjected to very careful scrutiny.

M. KUSAMA said that in the absence of the Japanese member of the Health Committee, he wished to express his warm appreciation of the excellent report prepared by Dr. Norman White on his investigation of the incidence of epidemic diseases in Far Eastern countries. The report was in itself an excellent contribution to the literature of epidemic prevalence in the Orient. Those acquainted with Oriental countries would appreciate the extremely difficult task which had been entrusted to Dr. Norman White. The task was difficult because it had to be completed in a comparatively short time, while the area traversed was vast, presenting varied conditions of life and customs under very different forms of government. The Commissioner who undertook this difficult task and accomplished it in such an admirable manner should be heartily congratulated.

The problem under discussion was a very vital one for Japan, as the extensive coast-line of that country was always menaced by epidemics, especially plague and cholera. The information and statistics collected in the report sufficiently described the facts and reiterated the conclusions of the reports presented by Dr. Miyajima to the Provisional Health Committee two years ago.

This was the first time that the question of the epidemic situation in the Far East had been presented in its complete form — not as a local problem but as an international health problem to an international health organisation.

Careful consideration should be given to the Commissioner's proposed draft of a Sanitary Convention for Far Eastern countries, which would possibly become a special part of the International Sanitary Convention of Paris. The question of adopting uniform quarantine regulations in the Far East had been discussed at the instance of the Japanese delegation to the Fifth Congress of the Association of Tropical Medicine of the Far East, which was held in Singapore in September 1923; after a long discussion a resolution had been adopted which was reproduced on page 8 of the report under consideration.

An agreement of the nature described, calculated to facilitate international co-operation, would receive support from the various Governments concerned. The Japanese authorities would not hesitate to co-operate with the other Governments.

As to the establishment of the international central bureau for epidemiological intelligence in the Far East, all must recognise the utility of such an institution, the details of which he hoped to have the pleasure of discussing. The Japanese Government would do all in its power to further the object in view, and the Health Committee would doubtless make the fullest use of the opportunity now afforded to foster international co-operation in the direction outlined in the report.

Dr. MIMBELA said that Dr. Norman White's report was of great interest to Latin America. The Committee could not, however, discuss in detail this remarkable report, on which the author should be warmly congratulated.

The countries of Latin America had concluded numerous special conventions and were in the same position as the countries of the Far East. The special conventions collected together might find a place in the general International Sanitary Convention of Paris.

With regard to the establishment of an international central bureau for epidemiological intelligence, Latin America was ready to support the Commissioner's proposal. Dr. Mimbela thought it of use to point out in this connection that the United States had already set up numerous information offices, especially in the countries of Latin America.

With regard to plague, he pointed out, in passing, that in several towns it had appeared in a pneumonic form, after having first broken out in a bubonic form.

M. VELGHE thanked Dr. Norman White for his summary and congratulated him on the report, which contained an enormous amount of information. A big task would now fall upon the Health Committee, which could not put aside so important a report without detailed examination.

The principal question to be studied was that of the Sanitary Convention. In this respect, Dr. Norman White had the right to special thanks. The last Sanitary Conventions were prepared by the representatives of all parts of the world, but recent study had shown that they were specially prepared in order to safeguard Europe from pestilential diseases coming from the East. Information had recently been collected, an enquiry had been carried out in the Near East, and the new draft convention took account of all the information which had been assembled by the recent mission.

Thanks to Dr. Norman White, those districts of the world which could be described as the cradle of plague and cholera were now better known and it would accordingly be easier to draw up a convention applicable to the Far Eastern countries. It was essential to attack the diseases at their source. Outbreaks of plague and cholera were always to be feared so long as they had not been attacked in the regions in which they were endemic. The Office international d'hygiène publique was entrusted with the duty of preparing for the revision of sanitary conventions; it would be very happy to make use, in this connection, of Dr. Norman White's report.

Dr. RAYNAUD thought that the questions raised by Dr. Norman White in his interesting report might lead to a very long discussion which it did not seem possible to continue in the full Committee. He had at his disposal an important collection of documents on plague based on a study extending over twenty-five years, but he did not think that it was desirable thus to take up the time of the Committee. He proposed that a sub-committee should be appointed which would present practical conclusions to the Committee.

Dr. JITTA associated himself with the congratulations which had been addressed to Dr. Norman White. His report was of the greatest interest, and would be all the more trustworthy since Dr. Norman White had availed himself of the collaboration of experts.

He thanked Dr. Norman White for his kind remarks regarding the authorities of the Dutch Indies.

He recalled the fact that, as early as 1922, the Government of the Dutch Indies had contemplated summoning a general conference at Batavia in order to draw up a sanitary convention. The question of a conference had, however, been adjourned, at the request of the Government of British India, in order to await the result of the work undertaken by the Office internationl d'hygiène publique at Paris. The Dutch Government was particularly interested in the question.

Regarding plague, Dr. Norman White had brought forward certain general principles. In Dr. Jitta's opinion it was not advisable to discuss this question in a plenary meeting. He therefore approved the proposal of Dr. Raynaud to appoint a sub-committee which, with the collaboration of experts, would facilitate the work of the Office international d'hygiène publique. He pointed out in passing that there was at the moment in Geneva a Dutch expert whose assistance would, he thought, be of great value.

Among the points raised in the report was the principle of the discrimination between infected or suspected ports and healthy ports; this principle was not included in the international convention of 1912. There was also the question of deratisation. Dr. Norman White had been right in drawing a distinction between the different categories of ports. The ports of the Dutch Indies numbered 275. Few of them were perfectly equipped. Others, such as that of Samarang, were admirably equipped for the campaign against cholera, smallpox, etc., but did not possess the means for deratisation.

Even if the Committee decided to set up a sub-committee for the examination of the Sanitary Convention, he thought that the question of the international central bureau for epidemiological intelligence in the Far East could be discussed in a plenary meeting.

Sir George BUCHANAN said that the Committee was very grateful to Dr. Norman White for his report.

It would have been a great advantage if one or two members of the Committee had participated in the mission, and he hoped that it might at some future time be possible for members of that Committee to see for themselves the conditions which prevailed in the Far East. The recent visit of certain members of the Committee to the Near East had proved of great value, and a similar first-hand acquaintance with conditions in the Far East was desirable if the Committee was to take up the question of quarantine regulations and other health questions of world-wide interest, more particularly as not many members of the Committee were acquainted with Far Eastern countries.

The question had been raised as to the procedure to be adopted with regard to the report He agreed that it should be distributed without delay to the various Governments concerned. No real progress could be made until the Governments had been officially informed of the results of the mission and had presented their observations. It would be well, in communicating the report to the Covernments, to draw their attention in a covering letter to the principal points

of administrative importance. If this were done, the replies of the Governments would be of more practical value.

It seemed also to be generally agreed that the report should be communicated to the Office international d'hygiène publique. This procedure had been followed in the case of the Near East report. There was a difference, however, between the two reports. The International Sanitary Convention now in force contained already a part relating to the Near East, and the question in that case was merely to suggest modifications and amendments.

In regard to the Far East, however, it was proposed that there should be a totally new chapter in the Convention, and it would be very difficult for the Office international to do more at the present moment than to discuss general principles arising out of Dr. Norman White's proposals in this respect, pending the receipt of the views of the Governments. It would be of little use for the Office international d'hygiène publique to discuss at its May session the draft articles of the Convention proposed in the report of Dr. Norman White, but it would be possible to clear the ground by establishing certain general principles. It would, for example, be possible to discuss the principle of accepting an arbitrary definition of ports, as "infected", "suspected", and "healthy". The system proposed by Dr. Norman White was based on such a classification of ports being made for administrative purposes. In revising the other parts of the International Sanitary Convention, some of the delegates to the Office international d'hygiène publique (Professor Jorge and himself among the number) had done their best to get away from all administrative action based on the arbitrary definition of "infected" ports.

It had been suggested that a sub-committee should be appointed. It would, however, be impossible for a sub-committee to report on the details of a scheme during the present session, though it might possibly study the main points for submission to a subsequent session of the Health Committee, or to the Office international d'hygiène publique.

It had been proposed that a bureau of information should be set up to assist the sanitary officers by providing them with a central intelligence department for the Far East. If this office were to be a medical organisation established for the convenience of the medical officers of the various ports, and not to be linked up with administrative measures, the suggestion might be carried out at once. Such an office appeared to be in urgent request by the port health officers of the Far East.

In the report of Dr. Norman White, however, the provision of medical intelligence was only one part of the work of the office which he proposed to set up. According to the report, this bureau would have important administrative functions. It would, for example, declare certain ports to be infected, etc. If the Governments were consulted as to a bureau for the purposes of medical intelligence only, they would probably agree at once to proceed with the scheme, but they would not perhaps be prepared to prejudge the adoption of the scheme as a whole, or the merits of the proposed Convention. It should, therefore, be pointed out that the proposal to set up an information office was put forward without prejudice to the administrative uses to be made of that office in the event of the scheme as a whole being ultimately accepted.

Admirable work had been done in collecting information in regard to the varieties of plague prevalent in the Far East. The results obtained were of great interest. He suggested that this information, or an abstract at least, should be published in the *Bulletin* of the Office international. The Office international had always followed the question with great interest and had a good deal of valuable material at its disposal.

Professor Léon BERNARD also congratulated Dr. Norman White on the very considerable work which he had done. The report before the Committee raised questions of a scientific character to which Sir George Buchanan had alluded. It also raised questions of an administrative and legal character, such as the drawing-up of a sanitary convention and the formation of a bureau of epidemiological intelligence in the Far East. The duties of this office would be: (1) to receive information and (2) to act as a centre of sanitary organisation and instruction.

Was it advisable to appoint a sub-committee to study the report ? The sub-committees which had been appointed up to the present had nothing in common with those that it would be desirable to appoint in this case, for two sub-committees would now be required: one to study questions of a scientific character and the other administrative questions.

The question of the proposed epidemiological intelligence bureau and that of the Convention were connected. Both raised questions with which Governments had to deal. If the Committee decided to establish an office, that bureau would, however modest its beginnings were, soon tend to develop into one of considerable size. An examination of these two questions would necessarily lead the Committee far; it would involve the intervention of the Governments. In any case, the sub-committees in question ought to be permanent and ought to keep in touch with the Governments. Their work would inevitably take considerable time, and it was only after a certain period had elapsed that they would be able to submit the results of their investigations to the Health Committee.

In conclusion, he supported the proposal of Dr. Raynaud, with the addition that the sub-committees should be appointed, one to study scientific questions, the other questions of an administrative character.

Professor JORGE thought that it would be possible to examine the report of Dr. Norman White without discussing it fundamentally from the scientific aspect. The report contained certain revolutionary ideas. Everyone was agreed that sub-committees should be set up to examine, in the first instance, the institution of an epidemiological intelligence bureau in the Far East. This was the simplest question and most susceptible of a rapid solution. As regarded the Sanitary Convention, it would be impossible to obtain any result during the present session. The sub-committee would, therefore, necessarily be permanent.

Dr. Norman White, in his report, had criticised the previous Sanitary Conventions. He could not associate himself with these criticisms. The Office international d'hygiène publique, when it had revised the Conventions, had naturally taken into account the criticisms which had been made, but health experts working in their studies were inclined to think that it was sufficient to put forward certain ideas for them to be applied in practice. It was just at this point that difficulties arose, for before applying the ideas it was necessary to obtain general assent.

Dr. Norman White had also said that it was necessary to introduce clauses concerning infected and suspected ports. Professor Jorge and Sir George Buchanan had done their utmost to combat the idea of a declaration of infected ports, precisely in order to be able to obtain frank and sincere compulsory notifications. Conventions were often accused of being arbitrary. Dr. Norman White might incur this reproach, since he proposed to declare ports to be infected according to the figures showing infectious cases. He had arbitrarily fixed that figure at 25, but it might quite well have been fixed at 12.

Professor OTTOLENGHI supported the observations of Dr. Jorge. He pointed out that page 24 of the French text of the report contained several conclusions of a scientific character, but the very basis of the protective measures against plague was to be found in those conclusions. If, therefore, a first sub-committee were appointed to examine scientific questions and a second to examine questions of an administrative character, these two sub-committees should be in close touch with each other.

Dr. Norman White had also said that the ports in which the existence of a plague in rats had been recognised should be declared as "infected". This was perhaps a rather extreme proposition, for in many of the ports of the Mediterranean, even the most important, rats which had died from plague could be found; nevertheless, the traffic of those ports could be continued quite well and without any danger if they were properly controlled and inspected by the local sanitary authorities.

The Health Committee should be in a position to express its views on the report in general, since the report constituted a whole, the parts of which were intimately connected. It would, nevertheless, be preferable for the detailed discussion of the report to be taken in sub-committee, as the discussions in plenary meeting were always somewhat protracted.

Professor Léon BERNARD agreed that scientific questions and questions of a practical nature were connected. It was evident that, if the Committee appointed two sub-committees, they should keep closely in touch with each other. There might perhaps be only one sub-committee divided into two parts, but in any case the work ought to be divided.

It appeared from the discussion which had just taken place that it would not be possible to make any progress in the study of the question during the present session. The report must be analysed and closely considered, for it was full of very interesting facts. It would only be after examination by permanent sub-committees that all the questions mentioned in the report could be solved by the Committee, which was not in a position to settle any of them during the present session.

Dr. RAJCHMAN agreed with Professor Léon Bernard that it would be impossible to settle the scientific questions at the present session. The report of Dr. Norman White, however, also raised questions of principle.

As regarded the Sanitary Convention, the procedure proposed by Sir George Buchanan was obviously right. Dr. Norman White's proposals would be sent to the Governments in the Far East, and it would be advisable to await their replies before undertaking anything definite.

As regarded the epidemiological intelligence bureau, the Health Committee might decide in principle whether its creation was necessary, and, if so, what its duties should be. Such a statement might have been made, even before Dr. Norman White's report was submitted to the Committee.

Professor Léon Bernard had expressed the fear that by establishing this bureau, the Committee might be forming the nucleus of an important international development which would involve serious considerations for the Governments. The Council, however, would have to take the political responsibility involved, as it had to confirm the decisions of the Health Committee. If the Health Committee gave technical reasons in favour of the establishment of this bureau in a particular locality, it might influence to some extent the decision of the Council. The Council alone, however, could decide in the last resort.

M. VELGHE said that the question whether the Committee should appoint one or two sub-committees was a secondary one. The present discussion, however, had not been useless, and it might be advantageous to continue an exchange of views which would give the sub-committees some useful guiding principles and assist them in defining their respective tasks.

The first sub-committee would be composed of persons quite different from those serving on the second, but they would both work in close collaboration. The first sub-committee would be composed of specialists in tropical diseases, and, above all, in plague, but it would not have to elucidate all the problems raised by the thirty-one points mentioned in the report of Dr. Norman White. It would be sufficient for the sub-committee to make known the present state of science in respect of these diseases in order that suitable prophylactic measures might be taken. The old conventions contained scientific errors from the point of view of present knowledge but were based on the scientific knowledge of the period in which they were concluded. The same procedure should be followed now, and it was not possible to wait until all the points raised by Dr. Norman White had been cleared up.

The first sub-committee would have to be permanent, and should meet before the next session of the Health Committee so as to reach conclusions which might be of service to the Health Committee.

It seemed at first sight that the second sub-committee could only work upon the conclusions reached by the first. It might, however, proceed with its preliminary work, receive documents and the replies of the Governments, and keep in touch with the first sub-committee. It might be appointed at once, meet as soon as possible, and also during the next session of the Health Committee. It might even be able to present definite resolutions during the present session — for example, on the question of the epidemiological intelligence bureau.

Dr. RAYNAUD was in entire agreement with M. Velghe. He had not wished to develop just now the reasons which had urged him to press for the appointment of a sub-committee. That sub-committee would ascertain whether the ideas of Dr. Norman White were generally acceptable. For this purpose, one sub-committee would be enough. It would be required to study the medical questions and their application, and it might divide into two parts for this twofold task. The sub-committee would also study the draft convention. It was impossible to foresee when it would conclude its work.

As for the epidemiological intelligence bureau, it might during the present session be discussed in the sub-committee, which would be able to present a decision on the question of principle before the Committee rose.

Sir George BUCHANAN thought that the sub-committee might immediately be constituted, to draft one or two definite proposals. It might, for example, draft a proposal concerning the epidemiological intelligence bureau.

The Office international d'hygiène publique, which was composed of epidemiologists and practical administrators, was, however, precisely the proper body to deal with these questions. It could act as a general committee or divide into smaller committees as required. The competence of the members of the Office international, who were public health officials, was at the same time administrative and scientific. It seemed so necessary to have recourse to this service that he would feel bound to oppose the creation of any sub-committees of the Health Committee to take up all these questions as if they were new. He could not go further than agree to the appointment of a small sub-committee instructed to extract from the report of Dr. Norman White one or several of the principal points for submission to the Office international before the examination of the replies from the Governments.

Professor OTTOLENGHI agreed with Sir George Buchanan. The present question was not one of ascertaining absolute scientific truth but of arriving at a scientific truth which would be practical and capable of immediate application. All things considered, he did not think that the report of Dr. Norman White raised questions which were too difficult to allow of their value being determined to some extent in one or two meetings of the sub-committee.

The most important question was that of pneumonic plague. He presumed that the sub-committee would declare that it was impossible to base measures against plague on the principle that pneumonic plague and bubonic plague were two entirely different diseases from the epidemiological point of view.

Professor Léon BERNARD feared that, in referring the examination of the whole report to the Office international d'hygiène publique, the Health Committee would forfeit in a way its right to deal with the question. The relations between these two organisations had, however, been defined in the Statute of the Health Organisation. Certainly it was for the Office international to deal with questions of conventions. The work could, however, be prepared by a sub-committee of the Health Committee. As regarded the epidemiological intelligence bureau, Dr Rajchman had said that the Council would take the final responsibility in the matter, but that its decision would, however, be governed to a considerable extent by technical considerations to which the Committee would have drawn attention in its recommendations. He feared that the Committee was not sufficiently well informed on the question. Dr. Norman White alone had gone to the Far East, and members of the Committee might feel it necessary to consult the experts of their respective countries. He was disposed to agree if it were merely a question of voting on the principle, but if it were a question of taking concrete decisions, of fixing the seat of the office and deciding its powers, from the geographical and scientific points of view, the Committee could not formulate resolutions immediately.

Professor JORGE said, with reference to the epidemiological intelligence bureau, that he was prepared to accept the principle of its creation. This did not imply, however, that his Government would support it; the colonies of Timor and Macau would be interested in the creation of that bureau, which would, however, involve expenditure.

The Office international d'hygiène publique should carry out the role already assigned to it, of an advisory committee in regard to the technical questions involved.

Dr. CARRIÈRE wished to be associated with the congratulations addressed to Dr. Norman White. As regarded the co-operation of the Office international d'hygiène publique in the examination of the question at present before the Committee, he considered that this co-operation was indispensable.

The Permanent Committee of the Office international having become the advisory body of the Health Organisation of the League of Nations, it seemed quite natural that it should be consulted regarding an international sanitary convention which concerned more particularly the competence of that Office, it being understood, moreover, that its competence was not limited to questions of this kind.

Further, the Permanent Committee of the Office being composed of Governmental representatives, it appeared to be the correct channel for consultation with those Governments. Direct consultation with the Governments would be superfluous at present, and the best procedure would undoubtedly be for the Health Committee to send the draft convention proposed by

Dr. Norman White to the Office international with a preliminary report and an indication of the questions which it particularly wished to have studied. This method of procedure seemed to Dr. Carrière to be the natural one and could not be considered as giving up, in any way, the rights of the Health Committee.

Dr. PITTALUGA thought that, even if the Committee decided to refer the two questions to the Office international d'hygiène publique, it could nevertheless, as Sir George Buchanan proposed, appoint a sub-committee in order to formulate the questions to be studied by the Office international.

Dr RAJCHMAN agreed that the report raised questions of doctrine and of practical application. He asked Professor Léon Bernard whether he could not go somewhat further regarded the epidemiological intelligence bureau and admit not merely the principle of its as creation but also discuss its powers, leaving on one side for the moment the question of its geographical seat.

The PRESIDENT thought that his colleagues would like to have some time to reflect upon this question and to take up the discussion at another meeting with a view to arriving at a decision.

The Committee agreed.

SIXTH MEETING

Held on Friday, February 15th, 1924, at 4 p.m.

Dr. MADSEN in the chair.

28. **Report by Dr Norman White on the Situation in the Far East** (*continuation of the discussion*).

The PRESIDENT summed up the discussion of the morning's meeting. Several members of the Committee had hesitated to approve the theories, in their full extent, contained in Dr. Norman White's report. The Committee, in any case, was not called upon to approve the report as it stood.

Regarding the examination of the report, from the scientific point of view, various suggestions had been made. Certain members of the Committee had contemplated the formation of a sub-committee of scientific experts. Others had proposed that the Office international d'hygiène publique should be left to discuss the report, which would be submitted to it as a matter of course.

It seemed to him to be difficult for the Health Committee to begin the discussion of the report from a scientific point of view. If, however, the Committee desired to assist the Office international in its task, it would have to decide whether it could or could not undertake a preliminary examination. With this end in view, a sub-committee of experts might be appointed to report to the Health Committee as to the extent to which the Committee should proceed to a scientific examination of the report.

With regard to the Sanitary Convention, all the members of the Committee were agreed in recognising that this question would in the end have to be left to the Office international.

As to the epidemiological intelligence bureau in the Far East, most of the members of the Committee had agreed that this office would serve a useful purpose. A sub-committee might draft a resolution approving the principle of the establishment of this office.

M. VELGHE wished to return once more to the question which had several times been discussed, namely: the relations between the Health Committee of the League of Nations, and the Permanent Committee of the Office international d'hygiène publique.

As Chairman of the Permanent Committee of the Office international, which he represented on the Health Committee, he claimed the sole right for the Office international to prepare all proposals to be made regarding Sanitary Conventions before their submission to the Governments. Nevertheless, the agreement concluded between the Office international and the League of Nations in no way prevented the Health Committee from undertaking a preliminary examination of these questions before referring them to the Office international. The Office international had indeed concluded an agreement with the League because, in particular, the League had at its disposal considerable means of carrying out enquiries and of prosecuting general work. The mission which the Health Committee had sent to the Near East had been of great service to the Office international in the drawing-up of one part of the Sanitary Convention, the revision of which the Office international was preparing.

With regard to Dr. Norman White's report, it did not seem that the Health Committee should confine itself to sending it to the Office international, as that Office would greatly benefit from a preliminary examination of the report by the Health Committee. The Office international would then be in the happy position of knowing the views not only of the Epidemic Commissioner but also of the Health Committee.

The Health Committee and the Office international were now two elements of the same organisation. Each had a task to accomplish in the same field. The Office international would be greatly assisted in the work of revising the Sanitary Conventions by taking into account the report of Dr. Norman White and the conclusions of the Health Committee. The opportunity should not be let slip of assuring between the two Committees a collaboration which would become increasingly fruitful.

Sir George BUCHANAN entirely agreed with the clear and official statement made by M. Velghe. He noted with pleasure that the members of the Committee were ready to come to an understanding on the procedure to be followed. He had stated his own views in a note which he had submitted to the Committee and which might serve as a basis for discussion.

He thought it essential that the sub-committee which it was proposed to establish should examine what passages of the report could be made the object of a statement to be submitted to the Office international. The Office itself could then examine these questions, which were of a scientific nature, which were of great interest to a large number of persons, and about which a considerable number of contributions had already appeared in the *Bulletin* of the Office.

As regarded the terms of the suggested Sanitary Convention for the Far East, it was impossible to discuss these before receiving the replies of Governments, but it would be an advantage meanwhile to know the opinion of the Office international regarding the classification of ports proposed by Dr. Norman White.

Professor Léon BERNARD was in favour of the plan proposed by the President. The latter had suggested that a sub-committee should be appointed to discuss whether or not the Health Committee should begin the examination of certain scientific questions in the report. He hoped this proposal would be adopted, it being understood that the sub-committee might call in the assistance of experts.

With regard to Sanitary Conventions, this was a matter which concerned the Office international d'hygiène publique. As M. Velghe had just pointed out, the sub-committee could, however, carry out a preliminary enquiry.

The President had also proposed that a sub-committee should prepare a resolution approving the principle of the establishment of an epidemiological intelligence bureau in the Far East.

These lucid proposals made by the President would, he hoped, allow the Health Committee to bring its discussion to a close at the end of half an hour. Sir George Buchanan's note reopened the whole matter; it was long and full of details, and raised, on a first reading, numerous difficulties. With regard, for example, to the epidemiological intelligence bureau, his proposal was too complex. The Committee should only, at the moment, take a decision on the principle involved. Consequently he proposed that the President's plan should be adopted.

Dr RAJCHMAN claimed the indulgence of the Committee for having distributed Sir George Buchanan's note before consulting the Committee. He had done so in order to facilitate the discussion. The note presented the whole question in all its aspects and it would be useful if the Committee would say if it only desired to discuss the question of procedure.

Dr. CARRIÈRE wished to make it clear that when he had insisted on the necessity for collaboration between the Health Committee and the Office international he had in no way contemplated that the question should be taken out of the hands of the Health Committee. He approved the procedure suggested by the President and M. Velghe.

Dr. JITTA approved Professor Léon Bernard's statement and the plan proposed by the President. He said he had not entirely grasped the sense of Sir George Buchanan's note and proposed that this note, which contained so much matter for thought, should be sent to the sub-committee appointed to examine the question of the epidemiological intelligence office.

On the proposal of the PRESIDENT, *the Committee decided to appoint a sub-committee to draw up a draft resolution regarding the establishment of a central international epidemiological intelligence bureau in the Far East. This Committee would also examine Sir George Buchanan's note and would be composed of:*

M. VELGHE,
Professor Léon BERNARD,
Sir George BUCHANAN,
Dr. JITTA,
Dr. MIMBELA.

The Committee, further, decided to appoint a scientific sub-committee composed as follows:

Professor Ricardo JORGE,
Professor NOCHT,
Professor OTTOLENGHI,
Dr. RAYNAUD.

Professor JORGE and Dr. RAYNAUD asked exactly what duties the scientific sub-committee would be required to perform and what period of time would be allowed to it before it ought to present its report.

M. VELGHE explained that the scientific sub-committee was not asked to decide on the theories put forward by Dr. Norman White but simply whether those theories in the present state of scientific knowledge could serve as a basis for preventive measures to be adopted in a new Sanitary Convention.

Professor Léon BERNARD explained that the members of the scientific sub-committee were not asked to give their personal opinions. They were asked whether the present scientific data were sufficient for a decision to be taken regarding certain opinions in Dr. Norman White's report which at first sight appeared to be paradoxical. If members of the sub-committee were unable to reply to this question immediately they could ask for time for reflection.

29. Report of the Opium Mixed Sub-Committee: Approval of Draft Resolution.

Dr. CARRIÈRE submitted to the Committee a draft resolution which he had drawn up in collaboration with Professor Léon Bernard and which had been approved by the Opium Mixed Sub-Committee. This draft resolution took account of the objections and the opinions which had been raised during the discussion.

After an exchange of views, the draft resolution was adopted in the following form:

> "The Health Committee, having taken note of a report on the work of the Mixed Sub-Committee on Opium and of the enquiries which it has set on foot with a view to determining the legitimate requirements of the various countries of opium and opium derivatives, it being understood that legitimate requirements are to be taken as meaning medical and scientific requirements alone;
>
> "Notes that it is impossible, with the data now available, to determine accurately any figure representing legitimate requirements:
>
> "Considers that, in fact, the estimate of 600 milligrammes of raw opium per head per annum adopted by the Mixed Sub-Committee considerably exceeds the quantities necessary for those requirements;
>
> "And considers that this estimate ought to be reduced to 450 milligrammes, it being understood that this figure represents a maximum and that, as it has been established solely on the basis of the estimates given by countries which have a highly developed system of medical aid, it can only be applied to countries in which similar conditions exist.
>
> "The Committee further considers that, since this figure is required essentially, in order to arrive at a reduction in the world production of opium and the manufacture of its derivatives, it should be regarded exclusively from this point of view and not as a guide to the legitimate consumption of any given country.
>
> "The Committee decides to refer to a later session the consideration of the remaining conclusions of the Opium Mixed Sub-Committee (as to cocaine, heroin, etc.)."

The Committee instructed Dr. Carrière, Rapporteur of the Mixed Sub-Committee, to inform the Advisory Committee on the Traffic in Opium that as regarded the fixing of an average figure for the legitimate requirements of narcotics the Health Committee was of opinion that its collaboration with the Advisory Committee on the Traffic in Opium had now ended.

SEVENTH MEETING

Held on Saturday, February 16th, 1924, at 10 a.m.

Dr. MADSEN in the Chair.

30. Approval of the Minutes of the Fourth Meeting.

The Minutes of the fourth meeting were approved.

31. Report of the Conference on and Enquiry into the Standardisation of Biological Products.

The PRESIDENT said that the account of the investigations of this question was partly to be found in the Medical Director's report. The Provisional Health Committee had authorised its Chairman to take advantage of the meeting of a Physiological Congress at Edinburgh in order to summon experts to examine this question. The Minutes of that session were before the Committee. Professor H. H. Dale, who had agreed to act as Director of Biological Research, had just drawn up a provisional report showing the point now reached in the investigations.

The report in question was read (Annex 7).

The PRESIDENT added that the investigations were being continued but that there was much laboratory work still to be done. There were, above all, certain preparations the rapid standardisation of which was an absolute necessity: for example, insulin; the methods of standardisation in regard to this subject had not yet been fixed, but the question was a very important one.

The President added that Professor Knaffl-Lenz, who had assisted at the Conference, was ready to give any technical information which the Committee might desire.

Professor NOCHT said that the Conference had also dealt with the question of oil of chenopodium, which was of capital importance in fighting ankylostomiasis. This disease was specially serious in America. Although there had not been many cases in Europe, certain persons of all ages and of both sexes had been attacked by the disease on their return from America. Oil of chenopodium, which was a vermicide, also possessed toxic qualities.

Professor Nocht hoped that the Health Committee would deal with these toxic qualities. The drug was prescribed in Germany and had resulted in three or four cases of mortality in the country in six months. It was necessary, therefore, to find out what was the proportion of its toxic qualities. It appeared that its toxic nature was due to impurities and not to the oil of chenopodium in the pure state.

Professor KNAFFL-LENZ pointed out that oil of chenopodium was not to be found in European pharmacopœias, but only in American pharmacopœias. Professor Vœgtlin had undertaken investigations, following the Straub method, which would certainly give rise to appreciable results.

Professor MIMBELA pointed out that oil of chalmoogra was much used against leprosy and that the investigations were sufficiently advanced for it to be used without fear of accident. In France, anzenol was the best preparation of chalmoogra oil. Investigations regarding this oil could be added to those already undertaken.

Dr. CHODZKO said that Professor Dale's report enumerated a certain number of preparations, some of which were more important than others: for example, pituitary extract was less important than organic arsenic preparations. He proposed that the Health Committee should insist that work in connection with these last preparations should be undertaken before work on other preparations.

The PRESIDENT explained that it had not been known before the meeting of the Conference whether it would be possible to get together learned men for the purpose of undertaking comparative researches analogous to those undertaken for the standardisation of sera. The Conference, however, had proved a great success and had shown that this method of work had an excellent future before it.

He would not fail to draw Professor Dale's attention to the importance of the remarks made by Dr. Nocht, Dr. Mimbela and Dr. Chodzko.

Sir George BUCHANAN said that he had been in Edinburgh for two days during the Conference, the work of which had been carried out in the most practical and efficient manner, thanks, in great measure, to Dr. Madsen, whose success in bringing together laboratory experts of different countries for co-operation was, as usual, remarkable. The visits of these experts, under the authority of the League of Nations, had been warmly welcomed by the Scottish Board of Health and by the University of Edinburgh.

The method of work typified by that Conference was essentially economical to the League. When the most distinguished and capable experts came together they worked in close union, which meant the attainment of excellent practical results entacling no expenditure on the part of the League of Nations. The role of the League, in a financial sense, was confined to granting modest sums of money with a view to helping them to complete comparative experiments in their respective laboratories. Some funds, of course, were necessary for the continuance of the work, and he would be happy if the President would inform the Committee what sum it would be necessary to set aside for this purpose in the next budget of the Health Organisation.

The PRESIDENT declared himself much flattered by Sir George Buchanan's remarks, but said that they ought to be addressed to the Secretary-General of the Conference, Professor Dale, who had so completely organised the Conference, and to the Scottish authorities who had so greatly facilitated its work.

Regarding the budgetary details, he would communicate them to the Sub-Committee on the Budget.

Professor PITTALUGA shared Professor Nocht's opinion regarding the importance of an exact titration of the toxic properties of oil of chenopodium. Ankylostomiasis was very prevalent in Spain among miners and among the workers in the ricefields on the east coast. Moreover, unless the conditions for its preparation, etc., were settled in advance, doctors would be very chary of prescribing oil of chenopodium because of the serious cases which it had occasioned. This might be of considerable interest, indirectly, from the prophylactic aspect, for thymol, which was the most generally employed of the vermicides against ankylostomiasis, required certain precautions, more particularly, abstention from alcohol, which, generally speaking, patients of the working classes were not ready to give up.

It would be necessary to have capsules of chenopodium oil carefully titrated from a point of view of its activity and toxic properties.

Dr. LUTRARIO shared the President's opinion regarding the great importance of the titration of insulin. This product was extensively used in Italy, but certain preparations of it, though very costly, were of little therapeutic value.

Professor Léon BERNARD agreed with Dr. Lutrario's observations which were true of France. The insulin prepared by certain manufacturers was of little worth and the question ought to be studied.

M. VELGHE asked whether it would not be possible to organise public official control.

Professor Léon BERNARD thought that this would be a most effective solution.

The PRESIDENT agreed with the previous speakers but feared that the question would give rise to serious difficulties.

Dr RAJCHMAN said that the question of insulin would doubtless come before the Health Committee. If the latter so desired, the Health Section might study the question from the point of view of its importance as a problem of international health. The University of Toronto, Canada, had set up a Scientific Committee which had received a patent for the manufacture of *bona fide* insulin, and this patent was in the hands of the Dominion Government of Canada. Insulin was manufactured in the United States for the University Committee of Toronto, which had recently entered into negotiations with the Health Ministries of Czechoslovakia and Poland with a view to transferring to them the rights of manufacture on two conditions (1) that the product should be made in accordance with the terms of the patent and (2) that it should be sold at a low price.

The question seemed to be complicated from the legal point of view, but it would be of advantage if it could be studied by the Health Organisation. The Medical Director had not yet received all the details from the Scientific Committee of the University of Toronto, but these would certainly be in his possession by the next session of the Health Committee.

Professor Léon BERNARD said he was very happy to hear the Medical Director's explanations and proposed that Dr. Rajchman should continue his enquiry on the question.

M. VELGHE said that there were countries like Belgium, for example, where remedies could not be patented, but where trade-marks were recognised. Considerable importance was accordingly attached to preparations made by certain houses, because of the care exercised in their preparation.

M. Velghe wished to place two considerations before the Medical Director:

(1) the fact that insulin was very costly, and
(2) it did not always offer the requisite guarantees.

Perhaps the investigations of the Medical Director would be premature, but it might be useful to undertake them with a view to arriving at official control. Such control was now exercised in Belgium in respect of various preparations: for example, arsenobenzol, and had given excellent results.

Professor Léon BERNARD hoped that Dr Rajchman would be able to collect all the national regulations concerning the control of drugs; such a collection would be of great importance, in particular, for the study of insulin and, in general, for any form of study undertaken by the Health Committee in this field.

Dr. JITTA said that in the Netherlands insulin was manufactured at Amsterdam under the direction of Professor Laqueur and under the control of the State Pharmaco-Therapeutic Institute, which was also carrying out experimental work on insulin. The product was then sold as Dutch insulin, which amounted to saying that it was controlled. The commercial world had naturally become interested in the preparation of the drug, but the public in general recognised that the official product of the State Institute was the better.

Sir George BUCHANAN said it would no doubt be useful to prepare a large volume on the present condition of legislation in the various countries, but this was a serious task and not to be lightly undertaken. The object, moreover, was being already attained gradually by other means. The British Ministry of Health, for example, had, on the occasion of the interchange now taking place, prepared a pamphlet, especially for the use of foreign visitors, giving a short account of the system of control of food drugs and medicaments. This pamphlet gave the facts in a more convenient form than was likely to be achieved in an official compilation or in replies to a questionnaire. The British system of control was complicated and could only be explained with reference to its historical development.

M. VELGHE was happy to know that England had undertaken this very interesting and important work. He thought that the agreement between the University of Toronto and the Czechoslovak and Polish Health Ministries was doubtless concerned with the preparation in these two countries of insulin in accordance with the Canadian method. As, however, the Health Committee represented all Governments, it might perhaps be better to write in the name of the Members of the League of Nations to the University Committee of Toronto in order to obtain what had already been obtained by Poland and Czechoslovakia. As the object of the University of Toronto was not commercial but scientific in character, that Committee might agree that the new method of preparation of the remedy should generally be made known through the intermediary of the League of Nations. The Committee was interested in preventing spurious products from taking the place of its own preparation.

Professor Léon BERNARD asked Sir George Buchanan if the pamphlet to which he had alluded only contained information concerning Great Britain.

Sir George BUCHANAN replied in the affirmative but thought that it would be possible gradually to collect information concerning other countries.

Professor Léon BERNARD thought a procedure which necessitated waiting for publications made by the various Governments would mean serious delay and he thought that the result would be more rapidly attained if the information were collected through the intermediary of the Health Section.

Dr RAJCHMAN said that, as regarded the question raised by M. Velghe, the proposed procedure would be better. Up to the present, the Health Section had not been able to collect information. A letter had been sent to the Secretary of the University Committee at Toronto but no reply had yet been received. He proposed that correspondence with that Committee should be continued and that the bearings of the question from an international point of view should be examined.

Regarding the collection of legal and administrative regulations on State control of the so-called biological products in the various countries, he hoped that he would be able to assemble this in a few months by writing direct to the authorities in each country entrusted with the duty of this control. Before publication, this collection of regulations would naturally be submitted to the respective Health Administrations for their approval.

The PRESIDENT said that probably much information could be obtained from Professor Dale, who was well acquainted with the administrative aspect of the question.

Sir George BUCHANAN asked whether the collection of regulations in question would be limited to the legislation of European countries.

Dr RAJCHMAN thought that, to begin with, information should be obtained from Europe and the two Americas only.

32. Appointment of Three European Doctors as Health Advisers to the Turkish Government.

Dr RAJCHMAN explained that, before the war, there had existed at Constantinople an International Health Board which had been suppressed by the Treaty of Lausanne. Clauses had been introduced into this Treaty with a view to winding up the Board. In the event of difficulties arising between the legal Commissioners entrusted with this work and the Turkish Government, appeal would be made to the League of Nations.

Technical questions were dealt with in special clauses annexed to the Treaty and signed by the three Turkish delegates.

The Medical Director then read passages from a document on this question (Annex 8) which had been distributed to the Committee.

He explained that the Treaty of Lausanne had not been ratified by the Great Powers. Nevertheless, Ismet Pasha, Minister for Foreign Affairs of the Government of Angora, had addressed to the President of the Health Committee a letter (Annex 8*a*) asking the Health Committee and the Office international d'hygiène publique to proceed to the appointment of the six European doctors, from which the Turkish Government must, in accordance with the Treaty, select three health advisers. The President of the Health Committee had replied to this letter (Annex 8*b*).

The Council of the League of Nations had nothing to do with the appointment of the doctors in question. This task was left entirely to the Health Committee, which must draw up a list in collaboration with the Office international d'hygiène publique.

M. VELGHE said that the Office international had received a letter similar to that addressed to Dr. Madsen. The Office had asked, through the Turkish Ambassador in Paris, for explanations with regard to the conditions of appointment and the salary of the health advisers which, in accordance with the Lausanne Agreement, must be fixed by agreement between the Turkish Government, the Health Committee and the Office international d'hygiène publique. Up to now no reply had been received and it had not been possible to take any action. He regretted this, for, from the point of view of the health of Europe generally, the present situation seemed somewhat dangerous. When the Health Board at Constantinople had come to an end, the representatives of the Allied Governments at Constantinople had established a provisional Health Board which was to be dissolved on the signature of the Treaty of Lausanne. This Board had accordingly ceased to function. It was not known what the Turkish health organisation had been from that moment, and it would be desirable to have information on the subject.

Perhaps the Health Section might be able to make enquiries on its own account. Constantinople was an important centre of international trade, and the produce of Constantinople arrived in Belgium either directly or though France and Great Britain. It was known, according to consular reports, that cholera and plague still existed in certain parts of Turkey. It would accordingly be useful, from every point of view, to have precise information concerning the Turkish health organisation.

Professor Léon BERNARD thought he could give some information, but, unfortunately, it was somewhat vague. The Inter-Allied Health Board appeared to have been maintained at Constantinople, at any rate until recently. It seemed that there were still in that city three doctors, an Englishman, an Italian and a Frenchman, who appeared to be constituting the Board and who continued to exercise unofficially their somewhat vaguely defined duties, with the tacit agreement of the Turkish Government. This was undoubtedly a precarious situation, and he was unable to certify the absolute veracity of the facts which he desired to present in a general and somewhat vague way.

He had discussed this question with his colleagues, Sir George Buchanan and Dr. Lutrario, and it was on their behalf, as well as his own, that he presented the following observations. The clauses of the Treaty of Lausanne had left uncertain the question of the salary of the health

advisers as well as their precise powers. It had also left undefined the rules which would govern their duties and the length of their engagements. Would they be occupied the whole day with official work or would they have the right to practise privately ? What were their exact relations with the Turkish administration, and to what extent would they lose contact with their respective Governments ? Would they wear the fez, etc. ?

The Treaty said that the list of six doctors would be drawn up by agreement between the Health Committee and the Office international d'hygiène publique. Here a question of procedure arose. It would be advisable for these two organisations to deal with the matter at a joint meeting. He therefore proposed, on his own behalf and on behalf of Sir George Buchanan and Dr. Lutrario: (1) not to establish a list during the present session but to adjourn the question until useful information had been secured; (2) to ask the Ottoman Government the various questions which he himself had just formulated and to request that the replies should be forwarded before the next session of the Health Committee; (3) to arrange for a simultaneous meeting of the Health Committee and the Office international d'hygiène publique. Since henceforth these two bodies formed part of a single organisation, it would be an advantage for them to hold a joint meeting in order to draw up a list of advisers.

Finally, it would be necessary to negotiate with the Ottoman Government. The Presidents of the two Health Organisations, viz., Dr. Madsen and M. Velghe, might be instructed to continue these nogotiations *ad referendum*, the final decision being taken by the Health Committee at its next session.

Dr RAJCHMAN explained that the Health Section had exchanged letters with the Health authorities at Constantinople in order to obtain epidemiological information. He read a letter from Professor Vidal, head of the Health Service of the Expeditionary Corps stationed at Constantinople, in which it was stated that the Inter-Allied Frontier Health Service had been replaced at Constantinople by the Ottoman Health Service of the Port of Constantinople and the Straits. This Service was under the direction of the Ministry of Health and Social Welfare at Angora.

The Medical Director had got into touch with this Service in order to obtain the epidemiological information required, and the Service had applied to the Health Ministry at Angora. It seemed clear that the Health Service at Constantinople was henceforth under the control of the Ottoman Government.

In September last the Ministry of Health and Social Welfare at Angora had asked the Chairman of the Provisional Health Committee for documents relating to the organisation of public health in France, Germany, and various other Western countries. This information had been collected by the Health Section and forwarded to Angora. Up to the present, these documents had not been acknowledged.

As regarded the establishment of a list of the six doctors, it might be questioned whether this implied the necessity for a joint session of the two Health Organisations. This procedure was not provided for in the Statute of the Health Organisation, and it might be well to examine the Statute before taking a decision.

Sir George BUCHANAN said he associated himself with the remarks which had just been made by Professor Léon Bernard, who had spoken as the result of a conversation which Professor Léon Bernard had had with Dr. Lutrario and himself.

He had not intended to make any observations, but, in view of the way in which the discussion had developed, he would like to know precisely where the Committee stood in the matter. Was the Committee merely to wait until it received information from the Ottoman Government as to the posts which it proposed to institute or had the Committee a more general duty as the trustee of the public health of Europe ? In his view, Allied plenipotentiaries at Lausanne had intended that the Health Committee and the Office international should negotiate with the Ottoman Government as to the character and conditions of the posts to be created.

The Allies had originally proposed that there should be a sanitary organisation of an international character at Constantinople for the sanitary defence of the Straits. This demand, however, had been withdrawn in favour of the proposal that there should be three European medical officers in the Turkish service, appointed after consultation with the Health Committee and the Office international, to advise as to the sanitary defence of the whole of the Turkish frontier. This implied that it was the duty of these bodies to ascertain the position and duties of the officers to be appointed by negotiation with the Ottoman authorities, and it would seem that Dr. Madsen and M. Velghe ought to be given a mandate to negotiate with the Ottoman authorities concerning the conditions governing the appointment of these officers and the duties which they would be called upon to perform.

Dr. RAYNAUD informed the Committee that he would shortly be able to communicate to it information on the port services of the Ottoman Government. He had trustworthy information to the effect that the health services were very strictly organised on the coast of Asia Minor and in the Straits. It was reported that passengers had been vaccinated against plague because they came from a port in which cases of plague had been notified. Very strict supervision was exercised over shipping.

M. VELGHE thought it was very difficult to reply to the important question raised by Sir George Buchanan. The Treaty of Lausanne had not yet been ratified, and, moreover, it was not the Treaty itself which provided for the appointment of the three health advisers but only an agreement annexed to the Treaty. Further, as the three doctors to be appointed would become Turkish officials, it would be necessary to have information with regard to the health services of the country in order to know what would be the rights and duties of these three officials. In these circumstances it was very difficult to take any steps in the matter in spite of a legitimate desire to make progress, all the more so as the Turkish Ambassador in Paris did not seem to have the

necessary instructions to enable him to reply to the questions which had been put to him by the Office international d'hygiène publique.

The best course would be to leave great freedom of action to the Presidents of the Health Committee and the Office international. According to the proposals which would be presented by the Ottoman Government, Dr. Madsen might consult with the members of the Committee or negotiate directly with the Ottoman Government on certain points. In any case, the negotiations would be lengthy, and it might perhaps be advisable to appoint a sub-committee. The President of the Health Committee must certainly be free to take any steps which the circumstances might require. It was understood, moreover, that the President of the Health Committee and of the Office international would not take any steps before having come to a previous understanding with one another.

Sir George BUCHANAN said that the question which to him seemed most important was whether it would be advisable to entrust the Presidents of the Health Committee and of the Office international with authority to act in the matter.

Professor Léon BERNARD thought that the appointment of a sub-committee would be indispensable if it were intended to develop this matter from the health point of view on the lines suggested by Sir George Buchanan. It was, however, perhaps wiser, for the moment, to deal with the more modest task of putting the necessary questions and of receiving the necessary information. This was a work which the Secretariat might undertake, and the letters might be signed by the President of the Health Committee in order to give them greater authority. Unhappily, in the present circumstances, information appeared to be difficult to obtain.

M. VELGHE wondered whether the President of the Health Committee or the Secretary-General of the League of Nations should not write to the Turkish Ambassador in Paris in order to ask him for the necessary information, as the Office international had already done.

Following an exchange of views, during which Dr. van HAMEL, Director of the Legal Section of the Secretariat, furnished explanations on the legal bearing of the Annex to the Treaty of Lausanne, *the Committee invited Professor Léon Bernard to draft the text defining the procedure to be followed by the Health Committee.* It was understood that this text would be distributed and discussed at the next meeting.

33. **The Pilgrimage Co-ordination Commission to be appointed in accordance with the Treaty of Lausanne.**

Dr. RAYNAUD asked whether this question, which arose out of Article 117 of the Treaty of Lausanne, might not be studied by a sub-committee pending the ratification of the Treaty. It was of the greatest importance to all the Moslem Powers that a proper solution of this problem should be found.

Sir George BUCHANAN said that he shared the anxiety of the other members of the Committee to see a full use made of the clause contained in the Treaty of Lausanne concerning the pilgrimages. He had recently made enquiries as to the position. In the view of the British Government, it was impossible to take any further definite action until the Treaty had been ratified.

Dr RAJCHMAN drew attention to Article 118 of the Treaty of Lausanne, which provided for reports on the work of the Pilgrimage Co-ordination Commission. The Treaty would doubtless be ratified shortly.

This question should at once receive the attention of the Committee, all the more so as the terms of Article 117 of the Treaty were ambiguous. This article mentioned "Powers which were interested" in this question of the supervision of the pilgrimages. It seemed clear that States which had not signed the Treaty were also interested in the supervision of the pilgrimages to Jerusalem. The Secretariat had received a letter from the Palestine Health Service asking for information on cholera in Persia. This epidemic had probably been introduced into Palestine by the pilgrims.

M. VELGHE said he did not pretend to propose a solution of the problem. He would merely observe that three groups of Powers might be distinguished, namely: (*a*) the Signatory Powers — and it was clear that Article 117 did not apply only to them; (*b*) the Hedjaz and the adjacent countries which were traversed by the pilgrims; (*c*) the countries whence the pilgrims came.

It might be said that all the above-mentioned countries were interested in the supervision of the pilgrimages and that the text of Article 117 of the Treaty was applicable to them.

Dr. JITTA agreed with the observations of M. Velghe. He also had understood that Article 117 was wide in its scope and that it referred to all the interested Powers. The Dutch East Indies were quite specially interested, as some 40,000 pilgrims out of a total of 80,000 came from that region.

The distinction might be drawn between pilgrims according as they came from the north, in part by railway, or from the south, particularly from the British, French and Dutch East Indies. This distinction, however, was not of very great importance from the point of view of epidemics.

He proposed that the question should be postponed until the next session and that the bureau of the Committee should present a report on the subject.

Sir George BUCHANAN wondered whether it was desirable to place this question on the agenda of the next session. He doubted if by that time much further progress would have been made. The provisions contained in the Treaty promised to be of considerable value and were to some extent based upon the conclusions of the report made by the mission to the Near East in

which some members of the Committee had participated. The interested Powers would presumably be obliged to take steps to apply this clause, but there was little possibility of any action being taken before May 1924.

The PRESIDENT proposed that the matter should be left open for discussion either at the next session or a subsequent session, according to circumstances.

This proposal was adopted.

34. **Report of the Sub-Committee on Cancer.**

Sir George BUCHANAN presented a report on behalf of the three members of the Cancer Sub-Committee who had been instructed by the Provisional Health Committee to deal with the question (Annex 9). The Sub-Committee on Cancer had met in November 1923 and had issued a report which had already been printed and distributed, and the proposals of the Sub-Committee had been summarised in that document. The report which he was now presenting contained an account of what had been done, since the previous report had been issued, to gain experience and to put into practice the system of comparative study which had been settled in November 1923.

He was convinced that the proposals outlined in the report now submitted and in the November report were practicable and not excessive. An invaluable opportunity was, in fact, offered for clearing up an important aspect of the cancer problem. He would refer the new members of the Committee, for a history of the question, to the documents already distributed and, in particular, to the pamphlet presented by Dr. Greenwood and himself to the Office international d'hygiène publique. This pamphlet, which was a reprint from the *Bulletin* of the Office international, showed the results of the general statistical enquiry about cancer and the circumstances in which the present limited enquiry was decided upon. He referred also to the League documents C.H.137 and C.H.177, which gave all the necessary facts.

He asked the Committee for authority to continue this work.

The PRESIDENT thanked Sir George Buchanan, Dr. Lutrario and Dr. Jitta for the great work which they had accomplished.

On the proposal of the PRESIDENT, *it was decided not to take up the question of expenditure, since it would be examined by the Sub-Committee on the Budget.*

Dr. LUTRARIO made the following statement:

"The synthetic report of Sir George Buchanan, and, even more, the summaries annexed to it, have shown the Committee that the enquiry undertaken in Italy covers a more widely extended field. It touches indeed the whole problem of cancer and not only the more limited problem of cancer of the breast and of the uterus.

"This larger conception is more completely apparent in my report and in its numerous annexes. I shall be flattered if the work which I have done receives your attention.

"I wish to make it clear at the beginning that, while adopting the broader point of view, our enquiry has rigorously followed methods of enquiry parallel with those adopted in the other two countries: that is to say, side by side with the general enquiry, a more limited enquiry into cancer of the breast and of the uterus has been undertaken. None of the data among those considered in the other two countries has been forgotten, and none prepared in such a way as to make it impossible for them to be used in the comparisons to be made.

"I must add further that every step in the execution of our programme has been communicated to the Chairman of the sub-committee, as well as to the Health Section.

"Why were we led to extend our enquiry ? We summarised the reasons at Paris, but I should like to repeat them here. We were inspired by two motives: (1) economic reasons and reasons suggested by the nature of the work; (2) scientific reasons.

"Regarding the first category, we were led to enlarge the field of our enquiry so as to effect economy in energy and in money. This may seem paradoxical, but, on the contrary, it was a rational method of procedure.

"It was decided in Paris to carry out a double enquiry on the past and the future. In the enquiry into the past history of the disease, information of two kinds has been obtained: (1) demographic (statistics of the causes of death); (2) epidemiological (investigations in hospitals, clinics, maternity homes and institutes of pathological anatomy).

"A period of three years (1919-20-21) has been chosen for the demographic part of the enquiry in order that the investigation should not be interfered with by the fluctuations caused by the war and by the influenza epidemic.

"We refused to make use of statistics already published but preferred to go back to the original sources. The investigation of the original sources was supervised and, indeed, directed by the Director-General of Statistics.

"In order to carry out this part of the enquiry, it was necessary to examine two million death certificates. This examination of the death certificates revealed certificates of cancer of the breast and of the uterus as well as of cancer in other parts of the body. As a result of this, we wondered whether we ought to abandon the scheme of cataloguing the certificates of cancer in other parts of the body than the breast or uterus, but we decided in the negative, for the registration of certificates of cancer in other parts of the body meant scarcely any increase in the length of the enquiry or in the expenditure. The data were before us. The time and money expended would have been about the same if we had merely kept to the female genital organs.

"If we had refused to examine documents which by good fortune came into our hands we might have been obliged to incur considerable additional expenditure of time and money if at some future date, the Committee had suggested that the field of enquiry should be enlarged.

The same is true as regards the enquiry in the health institutes.

We examined nine towns, eighty-two establishments, hospitals, clinics, maternity homes and institutes of pathological anatomy. In order to reply to our questionnaires the heads of these institutes had to examine the whole medical history of their patients during the period covered by the enquiry (1919-20-21). Would not this Committee have considered it unfortunate, both from the point of view of its work and from the point of view of the expense incurred, if we had not profited by such a golden opportunity to get into touch with the medical history of all kinds of cancer for this period of three years, and not only that concerned with the female genital organs ?

"What I have said as regards the past can be repeated with even stronger reason for the future.

"As regards the future we can take any measures we desire. For this reason a separate bulletin was contemplated which was to be much more detailed in respect of the cases of death, cases of cancer of the uterus, cancer of the breast, cancer of any other part of the body, and cancer autopsy. This information was to be obtained in the same institutes of the same nine towns as before.

"These were the first considerations which presented themselves. But there were reasons of a higher order, scientific in character. What was the object of this investigation ? The final object was the estimation of the different data, heredity, type of work, habits, and social and domestic life in general, which might influence the pathogenesis of this formidable disease.

"The investigation was undertaken in no mere spirit of statistical curiosity. The object was to probe, by all the means that demographical and epidemiological investigation could afford, to the bottom of this social problem of cancer, which was of so grave and difficult a character. Even if I could have justified in my own eyes a limitation of the retrospective enquiry owing to lack of material specially designed to serve this particular purpose, I could find no justification for limiting the field of enquiry in the future. Future enquiry, in my opinion, must be conducted on a more extensive scale. A limitation of the enquiry would be unworthy of the high purpose we have in view.

"While the problem of cancer has been taken up on all sides with enthusiasm — an enthusiasm which, in matters of scientific research, is continually on the increase — we could not, in my opinion, renounce the duty of assisting scientific research by an investigation which might satisfactorily meet the anxieties of the scientific world, which is expecting from us a ray of clear light piercing the darkness of the myserious situation surrounding that impenetrable sphinx, cancer.

"The report of the Italian delegation mentions the bibliography on the subject which has already been prepared. It recalls the fact that in the last twelve years 1702 works have been published in Italy on malignant tumours, of which 60 were from the pen of Professor Fichara, the steadfast apostle of the endocrine theory of the disease.

"Our idea of the method of dealing with the problem is by no means a novel one. We spoke of it in Paris, and we had hoped that our views would be shared, at least as regards the future, by our fellow-members ; I refer in this connection to the relevant passages in Sir George Buchanan's report.

"In any case, the enquiry undertaken in Italy in no way departed fundamentally from the task entrusted to the Sub-Committee, and the results we shall furnish will be comparable to those of the other two countries, since we have followed a parallel line of enquiry in regard to cancer of the female genital organs.

"I am, as always, at the disposal of the Committee, and am invariably happy to guarantee the collaboration of my country in whatever form appears to the Committee to be the most effective."

The PRESIDENT thanked Dr. Lutrario, in the name of the Health Committee, for the interesting statement which he had made.

In view of the late hour, the continuation of the discussion was adjourned.

35. Standardisation of Biological Products. Letter from M. E. Rost.

The PRESIDENT submitted a letter received from Berlin from M. E. Rost (Annex 10). He submitted a draft letter to M. Velghe, Director of the Office international d'hygiène publique, the text of which was approved (Annex 10*a*).

M. VELGHE informed the Committee that the Belgian Government had proposed to the Governments the summoning of a conference to meet probably in September 1924 or at the beginning of 1925. The Governments thus asked to attend would probably accept the invitation. If the Belgian Government agreed, the question contained in M. Rost's letter might be submitted to the Conference for its examination.

EIGHTH MEETING

Held on Saturday, February 16th, 1924, at 4 p.m.

Dr. MADSEN in the chair.

36. **Report of the Sub-Committee on Cancer** *(continuation of the discussion).*

Professor Léon BERNARD said he had carefully followed the statements made at the morning meeting and desired explanations on certain points.

Did the Sub-Committee propose to continue its investigations in three countries or to broaden the field of its enquiry ? If so, it would be necessary to consider the financial and other aspects. What was certain was that there were other countries, in addition to Great Britain, Italy and the Netherlands, which were interested in the question of cancer. In France, for example, public opinion had been aroused and, under the encouragement of the Ministry of Health, district anti-cancer centres had been established which were making investigations, ensuring the diagnostics and treatment of the disease and carrying out an active educational and social propaganda. These centres were at Paris, Lyon, Bordeaux, Montpellier, Toulouse and Strasbourg. These centres could provide the Sub-Committee with interesting information.

From a scientific point of view, it was difficult to understand why the Sub-Committee had limited its investigations to cancer of the uterus and the breast. Such a limitation was only understandable when it served to throw light on the general problem. This, however, was not now the case. It must be borne in mind that, if it had been desired to choose forms of cancer which were easy to diagnose, errors in diagnosis were as frequent in regard to cancer of the breast and the uterus as, for example, in regard to cancer of the stomach.

If it had been desired to investigate the reasons for the greater or lesser frequency of cancer in general, why had attention only been paid to the two forms of cancer which attacked exclusively women ? In his opinion this was a mistake from a scientific point of view, and he felt bound to point out that Dr. Lutrario had studied not only these two forms of cancer but cancer of all other parts of the body. In future, therefore, other forms of cancer as well as cancer of the breast and uterus should be investigated.

The amount of money asked for appeared to be fairly high. It was true that there was a solid reason for incurring such expenditure, but the League of Nations and the Governments had the right to demand that the results obtained should be entirely beyond criticism from a scientific point of view.

Dr. JITTA thought that the work carried out by Dr. Lutrario was very remarkable. Nevertheless, the Committee should bear in mind that the Provisional Health Committee had decided to restrict the scope of the enquiry into cancer. It had taken this decision for several reasons. First, it would be impossible to reach a conclusion in a short time unless the field of investigation were limited. Secondly, in regard to a retrospective enquiry, it was necessary to be content with the data given by doctors and the death certificates. Doctors in general, and, above all, country doctors, encountered difficulties in diagnosing any other form of cancer than that of the uterus and the breast. Finally, the Provisional Health Committee had chosen those two forms of cancer because it had thought that by these means it would be easier to determine the causes of the differences observed between the mortality records of the three countries investigated. As was proved by the statistics of Dr. Greenwood, the differences in the mortality rates were especially to be found in those two forms of cancer.

Dr. Lutrario had broadened the scope of his enquiry. The three members, however, of the Sub-Committee on Cancer were carrying out their investigations in Great Britain, Italy and the Netherlands in accordance with the same principles. It was an open question whether the enlarged investigation of Dr. Lutrario really effected an economy in time and money. Was not more time necessary to collect statistics concerning all forms of cancer ?

Sir George Buchanan and himself had used the same questionnaire as that used by Dr. Lutrario, but it was impossible — at any rate, as far as the Netherlands were concerned — to reply at the moment to certain questions — for example, the question of the influence of the patient's constitution.

The medico-social associations of which Professor Léon Bernard had spoken might be of great use. Switzerland was drawing up statistics of death from cancer. The Cancer Sub-Committee, as it proceeded with its work, could collect information from other countries in order to draw up a general report, but, in his opinion, it should not exceed the limits fixed by the Provisional Health Committee, though, at some future date, it might be possible to broaden the scope of the investigation according to the example given by Dr. Lutrario.

Dr. PITTALUGA gave certain information to the Committee regarding the institute for the study of cancer which had been established in Madrid by the General Direction of Public Health

and put under the direction of the surgeon Dr. Goyanes. This institute had been fitted out with the most modern scientific equipment. It also carried out statistical work, and in this respect the Sub-Committee of the Health Committee might usefully collaborate with it.

The question of cancer was of special interest in Spain, where there were 20,000 deaths a year from this disease out of a population of 21,000,000.

He laid a memorandum on the table giving information regarding the Institute at Madrid.

Sir George BUCHANAN said he had seldom approached any subject with greater hesitation or with a greater feeling of responsibility. He found himself Chairman of a Sub-Committee charged with international comparisons in regard to cancer as a result of his having been so rash as to introduce the subject, first to the delegates at the Office international d'hygiène publique, and then, because of its help, approbation, and enthusiasm, to the Health Committee, for practical action.

His difficulties, all through, had arisen from the immensity of the subject, which, in theory, everyone would agree, should be examined from every possible aspect — comparisons between countries, not only as regarded the intensity with which they suffered from every form of cancer but comparisons of every point of diet, race, national habits, and medical and surgical treatment in which the countries of the world differed. It should be remembered that superficial observations on these questions were useless and that it was difficult to ascertain whether facts and observations made in one country could be scientifically and correctly compared with what seemed to be similar observations in another.

Into this difficult problem one small point, established by the preliminary enquiry at the Office international, came like a ray of light. While cancer as a whole, and cancer of the digestive tract in particular, caused a mortality not strikingly different in England, Italy and the Netherlands, cancer of the breast and uterus presented the striking differences which had been brought to the notice of the Committee. In England there were about twice as many deaths from these causes as in the Netherlands, which was so near to England, and also as in Italy. It should be noted, moreover, that this discrepancy was not between the forms of cancer most likely to escape diagnosis; on the contrary they were classic forms of cancer in accessible parts of the body.

Was it not, therefore, a good and sound method to take this one fact and find out the explanation ? Could that explanation be found out otherwise than through an international organisation such as the Health Organisation — one which could utilise, as the representatives of the three countries, public health officers of standing and authority, able to use in their investigations the best clinical and statistical knowledge that their countries could provide ? Finally, was this not a sufficiently limited enquiry capable of completion within a year or two, at a cost to the international health organisation of a sum quite reasonably within its budget ?

In deciding to encourage action on these lines, there was no question of limiting the future or in any way of preventing other investigations of cancer. Just as Dr. Lutrario in Italy had been able to combine the international comparative work on cancer of the breast and uterus with a much wider cancer investigation, so also an attempt was being made in England to do the same by dovetailing the comparative international research into that which was being undertaken by the Cancer Committee of the Ministry of Health on a larger scale and relating to other forms of cancer. In fact, each enquiry had been found to help the other. The decision of the Provisional Health Committee to investigate the cancer problem, even in this preliminary and strictly limited way, had already given a strong impetus to the investigations of cancer in England, and the same thing was no doubt true for Italy.

In conclusion, the Sub-Committee, though it would not be so rash as to promise sensational results from this limited field of enquiry, could at least promise to supply new and carefully collected data that could hardly fail to be of value. If the Sub-Committee were to continue on these lines, as it would wish to do, it needed, and hoped to receive, all the encouragement, tolerance and support which could be given it by the Health Committee, and by the League of Nations itself in the matter of expenses, as well as by the permanent staff of the Health Section of the Secretariat.

Dr RAJCHMAN emphasised the importance of the financial aspect, which naturally was of concern to him. The Committee should give instructions to the Budget Sub-Committee, which would examine the requests for credits. He shared in this respect the uneasiness which certain members of the Committee had shown regarding the difficulties which might arise were the field of the enquiry to be broadened. This uneasiness had become apparent since the first discussion of the question by the Office international and by the Provisional Health Committee.

The enquiry into cancer was of supreme importance. It was conducted on new lines similar to those employed in the international investigations into biological products and serology. What was aimed at was not the mere collection of statistics but the organisation of a systematic investigation on the spot and the concentration of the attention of doctors on a specified point. The Health Organisation could not, from the international point of view, take up the whole cancer problem, and, in this connection, it would be better to change the name of the Sub-Committee on Cancer, which might give rise to misunderstanding.

In reality the problem was a limited one. The Provisional Health Committee had decided to undertake a systematic investigation in order to make the statistics of different countries comparable. The question was to aim at uniformity in statistical methods. With this end in view the limits fixed by the Provisional Health Committee should not be exceeded. If the Committee decided to collect information in countries other than the three neighbouring countries which were being investigated, as Dr. Jitta appeared to propose, the task thus undertaken would

prove a formidable one. It was important not to exceed the sums set aside in the budget for the investigation as defined at the moment.

The present investigation could be compared to the serological researches under the direction of Dr. Madsen. For these researches, appeal had been made to institutes which had been requested to carry out an investigation on certain specific points which might prove susceptible to international comparison. Special sums had been granted to these institutes. The same method which was applied to Great Britain, Italy and the Netherlands in carrying out the limited investigations into cancer could be adopted in other countries. By this means it would be possible to co-ordinate and centralise the investigations into the same problem.

Thus limited, the enquiry was of great importance from an international point of view. It necessitated some expenditure, but the sums asked for seemed to be very high. It would be the duty of the Health Committee to decide this point. As regarded the Health Section, it would do everything it could to facilitate the enquiry.

The PRESIDENT proposed that the question should be submitted to the Sub-Committee on the Budget.

M. VELGHE recalled the fact that in the past year it had been found necessary to have a veritable struggle in order to obtain a sum of 79,000 francs to cover all the work of the Health Committee, though the Secretariat had asked for a sum of 135,000 francs. In these circumstances it seemed to him doubtful whether 70,000 francs could be granted for the enquiry into cancer only.

Further, the enquiry threatened to assume considerable proportions. He recalled the origin of the enquiry. Sir George Buchanan having noted that a great difference existed between the statistics drawn up in Great Britain, on the one hand, and in the Netherlands and Italy on the other, on death due to cancer of the breast and of the uterus, had proposed to clear up this matter and to investigate the causes of this difference. This was a very interesting work, but it could not be foreseen that it would assume such large proportions. He therefore asked for an explanation.

Dr. LUTRARIO wished to make clear that the three members of the Sub-Committee were entirely agreed on the principles which must govern the investigations in Great Britain, Italy and the Netherlands. The results already obtained in these three countries would be found to be mutually comparable.

He had pointed out at Paris how advantageous it would be — at any rate as far as Italy was concerned — to seize so favourable an opportunity — providing as it did much valuable material — of utilising the data regarding cancerous growths in other parts of the body as well as those regarding cancer in the female genital organs. In Italy, for example, nearly two million death certificates, extending over a period of three years, were being examined. It would be very wasteful to retain only those cards which referred to cancer of the breast and cancer of the uterus, and to ignore the rest, for the whole work of sorting would have to be recommenced in the event of it being decided to extend the scope of the enquiry. A complete examination of these certificates would result in an economy of labour, and even of money.

Moreover, the Minutes of the Paris meeting did not refer solely to cancer of the breast and cancer of the uterus but also to other centres of the disease. Consequently in extending the scope of the investigation, Dr. Lutrario was but acting in accordance with the opinions expressed by the Cancer Sub-Committee.

Further, Italy possessed no statistics concerning the frequency with which this malady occurred in various trades and professions. Why should not the opportunity be taken to clear up this aspect of the problem, in relation to the numerous and conflicting theories which were advanced concerning the pathogenesis of the disease ? Much had been said as to the irritant action of various physical, chemical and alimentary agents. Naturally, in studying various occupations, the incidence of such irritant factors would be taken into account. In Italy, as a matter of fact, provision had been made for the classification of trades affected by mechanical factors (quarrying, cement works, the crushing of ores, etc.), thermic factors (iron and steel works, etc.), chemical factors (the bleaching and dyeing of silk, wool, etc.), and alimentary factors (slaughtering, the tinned meat trade, distilling, etc.). But this detailed classification did not, any more than the more general classification under the twelve headings, involve any departure from the original programme, because the divisions were dealt with in such a way that they could be grouped within the four major categories established in Paris.

Dr. Lutrario considered that the doubts expressed as to whether the questions connected with the endocrine theory could be satisfactorily solved were unfounded, for questions of this nature were not addressed to ordinary practitioners but to hospitals, clinics and pathological institutes. Such institutions would undoubtedly be able to deal with the matter satisfactorily.

He emphasised the fact that the present enquiry was the first international enquiry on this subject which had ever been made. In view of the extraordinary importance of the problem, it should not be carried out within a too limited field.

The most important consideration of all was that the results should be comparable, and Dr. Lutrario assured the Committee that those which would be obtained in Italy would possess, as far as possible, this indispensable characteristic.

Professor Léon BERNARD noted that the three members of the Cancer Sub-Committee did not appear quite to agree on the object to be attained. If it were desired to investigate the increase in cancer throughout the world it was difficult to understand why only two forms of cancer, and those concerning only one sex, were investigated, especially when the diagnosis of these forms, whatever might be said to the contrary, was no easier than that of other forms of cancer. If cancer were to be used as an index for the comparative study of statistics prepared

in different countries, cancer of the breast and of the uterus could well be chosen, but in this case it would be necessary to leave out of the enquiry considerations which seemed to prove that something more than an index was being sought (pathogenic considerations, amongst others). If, finally, it were proposed to investigate the causes of a difference observed in the mortality returns of death due to cancerous growths in the same organs, a proposal which was indeed the origin of the enquiry, then he was unable to understand why the enquiry was being conducted in three countries only and by methods of investigation which were not identical.

Sir George BUCHANAN regretted that Professor Léon Bernard had not been present at the meeting of the Office international d'hygiène publique, for he would then have been able fully to appreciate the simplicity of the situation.

A memorandum which had been submitted to the Office international by Dr. Greenwood and by himself contained explanations particularly as to the reason why it had been decided to undertake an enquiry in the three countries mentioned. The investigation concerned both the causes of cancer and cancer statistics. The work which had been planned meant applying methods designed to clear up the position and to draw lessons from it — whether on the nature of the cancer or on the reasons for the differences in the statistics; *prima facie*, it was improbable that the differences observed between the mortality statistics of the three countries were due to the different ways of obtaining them, but the enquiry would make it possible to arrive at definite conclusions on the question.

With regard to the cost of the investigation, if the individual countries were invited to make their own investigations at their own expense those who had already decided to investigate cancer would no doubt go on doing so. The British Ministry of Health would certainly go on, in any case. It would, nevertheless, be a matter for regret to refuse the grant of a modest sum which would secure what was otherwise not attainable: namely, the making it certain that the particular investigations decided upon would be conducted in the same manner in all three countries. A comparison of varying statistics was only possible if the investigations in the different countries were on strictly comparable lines. This comparison was of great importance from an international point of view. The sum requested was in proportion to the necessities of the investigation, and without it there would no longer be any link between the investigations carried out in the various countries, and this would gravely injure international collaboration.

The title of the Cancer Sub-Committee was not perhaps a very happy one in view of its limited reference, but, as Dr. Rajchman had pointed out, this question could be discussed by the bureau of the Committee. It seemed essential that the actual investigations should be conducted in each country by persons resident in the country. In regard to diagnosis, it was perhaps no easier to diagnose cancer of the breast and of the uterus than other forms, but these two forms would provide an index of comparison by reason of the importance they occupied in mortality statistics.

Dr. JITTA explained the meaning of his observations regarding the information which countries other than those in which the investigation was being conducted could furnish. The Committee was still in the experimental stage, and the data coming from other countries might shed light on the situation. Nevertheless, there was no question of extending the scope of the enquiry, the object of which Sir George Buchanan had very clearly explained. The question was to discover the reasons for the differences which existed between the mortality statistics of the various countries. When these reasons had been found, the etiology of cancer might to a considerable extent be illuminated.

The budgets of certain countries made provision for special credits for carrying out cancer research. But there were other countries where investigations would have to be discontinued if the Sub-Committee were unable to obtain the sum of money for which it asked. This sum did not appear to be very large if the fact that it would have to be divided among three countries were taken into consideration.

The PRESIDENT recalled the fact that the cost of the enquiry had originally been estimated for one or two years at about £1,000 to £2,000 sterling. It now appeared that this estimate was too small.

Dr RAJCHMAN said that the Cancer Sub-Committee had asked for 72,500 francs, together with a sum to cover certain travelling expenses and expenses for the meetings of the Sub-Committee.

Dr. PITTALUGA asked how the countries could get into touch with the Cancer Sub-Committee in order to ensure that the statistical data which they collected according to their own methods might not be altogether useless. The institute founded at Madrid for cancer research had sufficient credits at its disposal. It would, therefore, be advisable for this institute to be able to profit from the international enquiry and directly to co-operate in it.

Professor JORGE said that hitherto there had existed few statistics on cancer which could be compared with one another. As regarded the choice of cancer of the breast and of the uterus, he thought that their choice was a matter of course for a statistical index. Cancer of the skin, mentioned by Professor Léon Bernard, was sometimes difficult to diagnose, but the main objection to the choice of this form of cancer as an index was the fact that it was diminishing. The only forms which were increasing were cancers of the viscera.

M. VELGHE thought that the work of the Cancer Sub-Committee would be useful, even if the results were difficult to foresee. The Sub-Committee would be able to prepare a kind of programme of enquiries to be used by the various countries.

As regarded expenditure, the problem was not to convince the members of the Health Committee but to convince the Assembly of the League of Nations and its Fourth Committee. The

credit asked for would probably not be obtained; if it were refused, or appreciably diminished, it would perhaps be sufficient, when once the general plan of the enquiry had been established, to ask all the countries to conduct their own enquiries according to this programme.

Professor Léon BERNARD agreed with the above observations and said that the sole object of his own remarks was to define precisely the end which the Cancer Sub-Committee had in view.

As regarded the question of cost, the sum asked for would not be obtained, as M. Velghe foresaw, and, moreover, it seemed disproportionate with the object in view. Failure must accordingly be anticipated and some other less expensive method of work found. As the question was being studied in all countries, the Sub-Committee might be content with giving an impetus to the national investigations, co-ordinating their work and collecting all the useful information possible.

Sir George BUCHANAN noted that all imaginable objections from the financial point of view had been raised during the discussion, and he hoped they could all be answered to the satisfaction of the Committee. It was precisely in order to avoid considerable expenditure that the enquiry had been so strictly limited. Perhaps some part of the sum would be attributable to credits assigned to the Health Organisation from the Rockefeller grants for epidemiological and statistical work.

If the Committee thought that the work should be interrupted, in spite of its recognised utility, and if it were proposed that the Sub-Committee should confine itself to collecting information, an entirely new problem arose. It was for the Committee to decide.

The PRESIDENT noted that the members of the Committee were agreed as to the utility of the enquiry. He proposed that the question of the credits to be asked for should be referred to the Sub-Committee on the Budget.

The Committee, in view of its agreement, in principle, on the necessity of pursuing the enquiry, referred to the Sub-Committee on the Budget the financial question and the question of the procedure to be followed in continuing the enquiry.

37. **Appointment of three European Doctors as Health Advisers to the Turkish Government: Approval of Draft Resolution.**

Professor Léon BERNARD submitted the following draft resolution which he had drawn up with the assistance of Sir George Buchanan and Dr. Lutrario:

> "The Health Committee,
>
> "Having taken cognisance of the correspondence exchanged between the Turkish Government and the President of the Health Committee with regard to the drawing-up of a list of six candidates for the posts of sanitary advisers to the Turkish Government;
>
> "Considering that it is impossible to proceed with this designation without previously being in possession of information as to the functions, competence and obligations of these advisers, as well as to their relations with the Turkish Government, and their emoluments:
>
> "Resolves that its President, in consultation with the President of the Permanent Committee of the Office international d'hygiène publique, should enter into communication with the Prime Minister of Turkey, Minister for Foreign Affairs, in order to obtain from the Turkish Government the information referred to, which will be reported to the Health Committee at a later session."

The resolution was adopted.

The Committee further expressed the desire that direct relations might forthwith be established between the Health Section of the Secretariat of the League of Nations and the Turkish Sanitary Administration.

NINTH MEETING

Held on Monday, February 18th, 1924, at 10 a.m.

Dr. MADSEN in the chair.

38. Control of Biological Products: Discussion arising out of the Minutes.

Sir George BUCHANAN said that, on reading the Minutes of Saturday regarding the decision to instruct the Health Section to study the question of the control of medicinal preparations in different countries, he was uncertain whether the Committee had decided simply that regulations and legislation should be collected for the Library of the Health Section. The decision would, in that case, be perfectly acceptable. If, however, it meant that the Health Section would have to make a detailed analysis of systems of administration in different countries in regard to this question, a very considerable work was involved — one which might well require the whole time of a medical officer of the Section for twelve months. This would be contrary to the principles of economy which the Health Committee at the moment desired to follow.

Dr. RAJCHMAN said that the Health Section was prepared with its present staff to draw up a memorandum on the question within twelve months.

Sir George BUCHANAN recalled the fact that the Office international d'hygiène publique had recently carried out an investigation of the comparative legislation regarding the control of sera and of vaccines in the different countries represented on that body. It had been a considerable work; proofs had been sent to the Governments, and the delegates to the Office international had had to discuss them in detail. The investigation contemplated in the decision of the Committee might be very useful, but he considered that it would involve, for each country, an authoritative statement relating to all medicaments and drugs in regard to their importation, preparation, exportation, pharmacopœia standards, control by analysis, and many other questions. Was so big a task desirable ?

Dr. RAJCHMAN recalled the fact that the investigation was concerned only with biological products.

Sir George BUCHANAN said that, if the decision related only to insulin and a few articles of the same nature, he had nothing more to say. But the Minutes had given the impression that it was intended to examine the question of the control of "medicaments" in general.

39. Approval of the Minutes of the Fifth, Sixth, Seventh and Eighth Meetings.

Subject to the observations recorded in Minute 38, the Minutes of the last four meetings were adopted.

40. Report on the Standardisation of Sera and Serological Tests.

The PRESIDENT said that this question was summarised in paragraph (B) on page 11 of the Medical Director's report, as well as in document C. H. 182, of which he personally was the author (Annex 11).

A. *Investigations into the sero-diagnosis of syphilis.* (Annex 11, paragraph 7.)

The PRESIDENT explained that this question originated from a proposal of the British Ministry of Health concerning free treatment in the ports of different countries for sailors suffering from venereal diseases. The proposal had been examined by the Office international d'hygiène publique, and a draft Convention was sent out to the Governments containing the proposal that each patient should be provided with a book, which he should always have with him when going from one port to another, containing information regarding the examination of his case.

It was also suggested that a uniform nomenclature for the results of serological examinations should be adopted. For this purpose, comparative serological investigations were undertaken, and it was considered best that they should comprise, in the first place, a comparison between the different Bordet-Wassermann tests, as carried out in different laboratories, and some of the best flocculation methods (Sachs-Georgi, Sigma and Meinicke). A real standardisation of the Bordet-Wassermann methods did not seem practicable, but it was considered that a standardisation of the flocculation reactions might be possible.

At the London Conference in 1921 it was decided that a series of leading laboratories should undertake a number of comparative investigations between their own Bordet-Wassermann tests, but when the Conference met again at the Pasteur Institute in Paris it was obvious that there were very serious differences in the carrying out of the flocculation methods. A technical Sub-Committee met to consider all the details and gave very full instructions for future work, but the reports received at Copenhagen showed clearly that, in spite of all the foregoing discussions and agreements, similar results were not reported. An assistant was then sent from Copenhagen to compare the details of the methods employed in the various laboratories. Certain differences in technique were found, and these differences, though they appeared to be of slight importance, gave rise to great divergencies in the final results.

In the autumn of 1923 the work had progressed to such a point that it was considered useful to convene a Conference at the Serum Institute at Copenhagen in order to determine as exactly as possible the causes of the differences. This Conference met from November 19th to December 3rd and its results were given in the report before the Committee. The meeting at Copenhagen had been a real "working conference" — perhaps somewhat tiring — at which experienced scientists were sitting together from morning till late evening in the most complete harmony. Such a conference was really a kind of interchange, and this kind of work would surely prove useful in the future.

The Conference had also adopted a series of very simple symbols for indicating reactions. These symbols were as follows:

++	strong reaction,
+	reaction,
±	doubtful reaction,
—	no reaction,
o	reaction not made.

B. *Anti-diphtheritic serum.* (Annex 11, paragraph 1.)

The PRESIDENT referred to the fact that the Czechoslovak delegate to the fourth Assembly had expressed the hope that a common standard of this serum could be adopted by all nations. The Office international d'hygiène publique had drawn up a draft arrangement concerning anti-diphtheritic serum, which also provided for the adoption of the Ehrlich standard unit. This scheme had been sent to the different Governments. It would, therefore, be necessary to await the replies of the Governments before making a further appeal, as was desired by the Czechoslovak delegate.

The President asked the Committee's permission to include the question of active immunisation against diphtheria among the investigations to be undertaken.

C. *Anti-dysenteric serum.* (Annex 11, paragraph 3.)

A great divergence of views had become apparent in London regarding the standards of this serum, but good progress towards agreement was being made.

It would perhaps be possible to summon a small conference of laboratory workers on the lines of the one which had met in Copenhagen in 1923. Anti-dysenteric sera were on sale the antitoxic value of which varied greatly.

D. *Anti-pneumococcic serum.* (Annex 11, paragraph 4.)

The PRESIDENT would be happy to receive information on this subject from those of his colleagues who were interested in it.

Professor Léon BERNARD asked the President on what particular point be required information.

The PRESIDENT replied that he would like to have statistics of the various types of pneumococci.

Professor Léon BERNARD assured the President that he would be able to give him useful information resulting from work done in France on the subject.

E. *Anti-meningococcal serum.* (Annex 11, paragraph 5.)

The PRESIDENT said that he did not anticipate that a method would be found which would be acceptable to all laboratories. He would be happy to have information from his colleagues on this subject.

F. *Anti-streptococcal serum.* (Annex 11, paragraph 6.)

The PRESIDENT said that this serum was employed a good deal everywhere but that opinions regarding it were very divergent.

Professor OTTOLENGHI proposed that, in addition to the sera already being studied, the serum against anthrax should be examined, and also that against Malta fever, as both of these diseases were very serious. Excellent sera were in existence, but among the samples at present on the market there were many of which the titration was not known, nor the method of manufacture. He had been a pupil of Professor Sclavo, who had been the first to prepare the serum against

anthrax. In Professor Sclavo's laboratory it was considered necessary that the serum should be able to save a rabbit which had been injected with a very large dose of the anthrax culture. Other people had proposed that the titration of this serum should be made by means of a very weak culture; it was necessary to obtain exact conclusions.

As regarded the serum against Malta fever, it was also desirable that it should be well controlled, since, when well prepared, the serum was very valuable, especially when used at the outset of the disease.

Professor PITTALUGA said he had been authorised to state that the General Sanitary Administration of Spain and the Direction of the National Health Institute at Madrid were at the disposal of the Health Organisation in order to co-operate in serological research. The National Health Institute at Madrid was preparing for the State the sera mentioned in the report of the Conference at Copenhagen, as well as the serum against Malta fever, which was also prepared in certain private serotherapeutic institutes, presenting excellent technical guarantees; these institutes certainly would welcome an agreement on a possible titration of the bacteriological power of this serum; Malta fever was very widespread in Spain; many goats were infected.

He supported the proposal of Professor Ottolenghi.

Professor Léon BERNARD said he would like especially to congratulate the President of the Committee on the serological research which he had so successfully directed. The results attained showed that this part of the activity of the Health Committee was one of the most interesting and most fruitful. Medicine was fortunately turning more and more in the direction of laboratory tests, but the tendency to base medical diagnosis on these tests might become dangerous, particularly in respect of syphilis, for a test which was very difficult to carry out — such as the Bordet-Wassermann test — was very often conducted by persons insufficiently qualified and led to a precise diagnosis. When the results of the present research had been obtained it would be advisable for the Governments to intervene in order to ensure that the laboratories were conducted by competent persons. He believed that in Germany a laboratory which was not recognised could not undertake the Bordet-Wassermann test.

The anti-streptococcal serum had been the subject of investigations which had been unsuccessful. It was of great importance that progress should be made in these investigations. In France some increase of puerperal diseases had been observed.

The serum against Malta fever was also of great importance, for the germ was making considerable progress in France, not only in the Pyrenees and the Mediterranean districts but also in the north of the country, where it was propagated by goats brought from elsewhere. Hitherto, it had not appeared that the value of this serum was very great. He was accordingly surprised by what Professor Ottolenghi had said, and he believed it would be interesting to compare the serum of the Italian laboratories with that produced in the French laboratories. In France, up to the present, the serum in question had been of little use except for laboratory research.

Dr. CHODZKO associated himself with the thanks which had been offered to the President, and asked that they might be the subject of a special vote as a mark of the gratitude felt by the Committee for the distinguished work which Dr. Madsen had done.

From the administrative and clinical points of view, he had been struck by the statement made by Dr. Madsen to the effect that only the large laboratories should undertake this kind of research. He feared that in all countries doctors not sufficiently qualified set up laboratories for serological research — a proceeding which involved serious danger for the public health. He proposed that the Health Committee should issue a recommendation to the effect that examination of the blood of syphilitic patients should be undertaken by public laboratories and that private laboratories should be controlled by the State. This question had already been the subject of very strict measures in Germany, but still more drastic steps might be contemplated in order that practical and immediate results might be obtained.

The PRESIDENT drew the attention of Dr. Chodzko to the resolution contained on page 70, paragraph 3, of the report on the Conference of Copenhagen (C. 5. M. 5. 1924. III).

Sir George BUCHANAN said that there was no direct official control in the United Kingdom over the application of the Bordet-Wassermann test, but there was a species of indirect control owing to the fact that the majority of the work was done under a system whereby the State contributed to the cost of the examinations. A certain amount of concordance was established between the laboratories in this way through the experts at the Ministry of Health, who undertook the supervision of the system of gratuitous treatment of venereal disease. The conference recently held at Copenhagen would lead to an even greater degree of uniformity of method. An understanding having been reached in regard to the standardisation of methods, a central laboratory would serve all the other laboratories for purposes of comparison and advice.

He was not competent to pronounce judgment upon the bacteriological proposals contained in the report, but he had discussed the work referred to with representatives of the Medical Research Council, who had assured him that these proposals were in harmony with their ideas and that they were in favour of their practical realisation. The United Kingdom was specially interested in anthrax, and he would like to support the proposal in regard to the Sclavo serum.

He would point out in regard to Malta fever that this disease was no longer associated particularly with the island after which it was named. The disease had been eliminated from Malta, not by sera and vaccines but by dealing with the goats.

The expenditure on this work might be considerable in comparison with the small budget of the Health Organisation, but its effect in the various countries would be immense, and it was a form of expenditure which, like that proposed for the comparative cancer investigations, was really most economical. By spending in a judicious manner what, after all, were small sums, the

League of Nations obtained the willing and practically gratuitous services of the highest authorities on the subject investigated.

Dr. NOCHT said that the German laboratories in which the Bordet-Wassermann test was made were controlled by the Governments, but he did not quite know the details regarding this control. Private laboratories were also allowed to do this work, but theywere under supervision.

Licences were usually granted to known bacteriologists. A definite method was also prescribed for obtaining the antigens.

M. VELGHE associated himself with the thanks which had been addressed to the President, as well as with the observations of Sir George Buchanan concerning the great utility of the research work which had been undertaken. He hoped that these investigations would be continued and that results would be obtained which would be accepted by the scientific world.

He proposed to send the conclusions relating to anti-diphtheritic and anti-tetanic serum to the Office international d'hygiène publique, when the work of the Committee in regard to the latter serum was finished, with a view to their incorporation in the draft Convention which was being prepared by the Office. As regarded the other sera, he proposed that the President should be asked to continue the work. With reference to the sero-diagnosis of syphilis, he was glad to know that it was proposed that all countries would adopt common symbols for the books to be issued to seamen, whatever method of diagnosis was used. This was a considerable step forward.

M. Velghe thought that limitations with regard to the laboratories were covered by the resolution on page 70 of the report of the Copenhagen Conference. In Belgium, laboratory research in respect of syphilis was not privately conducted but was pursued in the provincial and State laboratories (one laboratory for each province). These were official institutes which carried out gratuitously research for medical men. In addition to these laboratories there were others attached to the more important hospitals, which rendered considerable service as they were in frequent touch with those suffering from the disease. He would like to see clinical and bacteriological investigations carried on simultaneously and specialists in the disease to be encouraged to set up their own laboratories. It was not advisable to discourage the system of private research as would be done by a resolution in the terms proposed by Dr. Chodzko, for this system was very useful. If, on the other hand, the resolution in question were intended to cover only private laboratories of a certain kind he would gladly support it.

Professor PITTALUGA also associated himself with the tribute which had been paid to the President. He would observe, with reference to the standardisation of the serological tests for syphilis, that it appeared from the discussion that it was not advisable for private laboratories to undertake research work without the necessary guarantees. On the other hand, he agreed with M. Velghe in asking that Dr. Chodzko's text should be modified, and he shared the opinion of M. Velghe that the text of the resolution on page 70 of the report of the Copenhagen Conference went sufficiently far. The Health Committee might adopt this text, perhaps giving it further emphasis. It was not advisable, moreover, to distinguish between private and public laboratories since the Pasteur Institute itself was a private laboratory.

He would urge that the serum against Malta fever should also be investigated. The sero-therapeutical results obtained by means of this serum differed widely. Real results could only be obtained by giving large doses of the serum — a practice in which the majority of doctors hesitated to indulge.

As regarded the antitoxic powers of the anti-diphtheritic serum, he begged to communicate the results of the last experiments made by Dr. Tapia, of the Health Institute of Madrid, who had been present at the investigations made at the State Institute of Copenhagen in the autumn of 1923. These results concerned the Ramon method and showed a correspondence between the intensity of the power to produce flocculation and the toxic power of the toxin.

M. KUSAMA said he was glad to associate himself with the other members of the Committee in appreciation of the work which had been done by Dr. Madsen. In Japan there was State control of the preparation of antigens, but manufacture was permitted in private institutions which secured a concession from the Government. He agreed with Dr. Pittaluga that control was necessary according to the principles laid down in Dr. Madsen's report.

As regarded the anti-dysenteric sera, he regretted the delay which had taken place in communicating the results of the researches conducted under the supervision of Dr. Shiga. This delay was due to the absence of Dr. Shiga in Korea and to the recent earthquake. He would like to assure Dr. Madsen that he might count henceforth on all possible collaboration on the part of the Japanese investigators.

M. VELGHE explained that in Belgium the antigen was distributed to the laboratories by the Bordet Institute and that all the laboratories followed the Bordet-Wassermann method. There was a principle in the proposal of Professor Léon Bernard and Dr. Chodzko which would hardly be acceptable in Belgium, or, doubtless, in certain other countries: namely, the principle of Government control.

Dr. RAJCHMAN asked whether Professor Léon Bernard and Dr. Chodzko would not be satisfied with a resolution instructing him to forward the report of the Copenhagen Conference to all the health administrations, drawing their attention to the third resolution contained in the report (page 70).

Professor Léon BERNARD said he agreed with M. Velghe that the control would give rise to difficulties, in France, as elsewhere. He thought it his duty, however, to affirm the necessity of control.

The formula proposed by the Medical Director did not appear to him to be sufficient. He was convinced of the benefits which would result for public health from the institution of control. The control practised in Germany showed that it was possible. Control was also in force in certain States in the United States of America, for example, in the State of New York; the State laboratory of Albany sent experts for a few days to each of the laboratories of the State and controlled the work which was to be done in them.

There might be public laboratories which were extremely unsatisfactory, and private laboratories which were excellent. It would be unnecessary, therefore to make any comparison between public and private laboratories, but it would be indispensable to have some organisation controlling all laboratories.

The PRESIDENT thought that the results of the Copenhagen Conference would serve as a basis for States desiring to establish control The learned men who met at Copenhagen had been the highest authorities in their particular subject, but even their results showed divergencies due to differences in technique. In these circumstances, the only control was a comparison of the results.

Sir George BUCHANAN suggested that the Committee should limit itself to the proposal made by Dr. Rajchman: namely, to draw the attention of the Governments to the views expressed at Copenhagen. The other proposals before the Committee might raise certain difficulties. The question of the amount and method of official control to be introduced was a domestic question and one which required delicate treatment in the United Kingdom.

M. VELGHE recalled the fact that the members of the Committee, since they belonged to different countries, looked at the question, so to speak, from a national point of view. As a Belgian, he did not see how he could support the proposal made by Professor Léon Bernard and Dr. Chodzko. He quoted as an example that in Belgian, as regarded investigations into plague, a decree of 1889 had laid down that only laboratories recognised by the provincial governments could undertake such research work, to be carried out in accordance with certain conditions determined by the sanitary authority. This decree, however, had appeared too rigorous, and the Superior Health Council of Belgium had recently adopted a resolution by the terms of which it was sufficient that laboratories should be recognised by the provincial government, the scientific guarantees presented by the persons thus authorised being sufficient. These persons should be left free to do the work and to carry it out on their own responsibility.

With regard to private laboratories undertaking research work for doctors and having therefore a commercial nature, control would be useful, but for research institutions directed by qualified persons it would be impossible to contemplate the organisation of a control in Belgium, and this would also be the case as regarded doctors specialising in syphilis, who had set up a laboratory in connection with their clinics.

Dr. MIMBELA feared that the difficulties pointed out by M. Velghe would also arise in his country, where there were but two or three laboratories: a State laboratory and a laboratory attached to each Government hospital. He could only make representations to his Government in his capacity as a member of the Office international d'hygiène publique and not as a member of the Health Committee. He proposed therefore that the resolution in question should be communicated to the Office international in order that it might be forwarded to the different Governments.

Dr. JITTA shared M. Velghe's point of view. The same regulations existed in the Netherlands as in Belgium. In addition to the State laboratory there were municipal laboratoties and provincial and private ones, all of which possessed the necessary guarantees. The Medical Director's proposal therefore seemed to him to be preferable.

Dr. LUTRARIO stated that distinction should be made between different kinds of specialists, for there were doctors who set themselves up as specialists. They could not be considered as sufficiently qualified to undertake the direction of a laboratory without careful control. He therefore supported the resolution proposed by Professor Léon Bernard and Dr. Chodzko. As a kind of analogy, he quoted what occurred in Italy as regarded the institutes preparing sera. They had to have previous authority from the State, and this could not be given until an inspection had been made, in the course of which it had to be ascertained whether the organisation of the institute was satisfactory and whether it was in competent hands. The institute, moreover, remained under the supervision of the authorities who inspected it from time to time. It would not therefore be difficult to do the same in the case of laboratories applying the Bordet-Wassermann test.

Professor Léon BERNARD thought that in the interests of public health it was necessary to establish the principle of control. Moreover, the text which he proposed was not a recommendation but merely instructed the Medical Director to draw the attention of the Governments to the question.

Dr. JORGE said that in Portugal there were, in the three universities, official laboratories open to the public and belonging to the Faculties of Medicine. The control of these laboratories would not be possible. The case was different regarding private laboratories, for anybody could call himself an analyst, and some deplorable mistakes were made. How would it be possible to control laboratories if the profession of analyst was free and even protected by medical diplomas? The fact of the matter was that it would be necessary to control those doing analytical work as a profession.

Professor PITTALUGA said that, as Professor Léon Bernard no longer made any distinction between private and public laboratories, he supported his resolution. In Belgium and in the Netherlands there appeared to be a previous guarantee. The objections raised by M. Velghe and Dr. Jitta in no way reduced the importance of extending that guarantee to all countries. Dr. Jorge had spoken of the regulation of the profession of analysts. In Professor Pittaluga's opinion, the moment had now come for State intervention in this matter.

As the word "control", however, seemed to be repugnant to M. Velghe because it suggested a new bureaucracy, it could perhaps be replaced by the words "technical guarantee".

M. VELGHE said that he was ready to accept the resolution as amended by Professor Pittaluga, for the technical guarantee would result from the scientific standing of the analysts.

Professor Léon BERNARD was unable to accept Professor Pittaluga's amendment, for there was a difference between "technical guarantee", which was exercised rather before the laboratory was established, and "control", which covered the working of the laboratory after its establishment. Once a guarantee was given, the matter was at an end. Control, however, could be renewed from time to time. There was, therefore, a great difference between the two terms.

With regard to Dr. Jorge's proposal, it was of great interest and it would be of great use to elaborate a statute for the profession of analyst, but this would be a long and difficult task and of a different character.

Sir George BUCHANAN wished to suggest a third text. He thought the Committee should confine itself to forwarding the Copenhagen report and drawing attention to the third paragraph on page 70 of the report. The resolution should end at this point.

He would vote for a resolution in this sense, but he would be obliged to vote against the other two texts which had been proposed. He did not think it advisable to pass a resolution which was likely to cause embarrassment to the Governments.

Professor Léon BERNARD said that he could understand Sir George Buchanan's objection if the Health Committee had been seeking to impose a form of control on States, but the proposal was merely that attention should be drawn to the matter. States which could do nothing would content themselves by taking note of the resolution.

After an exchange of views, *the Committee adopted a first resolution drawn up by Professor Léon Bernard and Dr. Chodzko in the following terms:*

> "The Committee wishes to express its cordial thanks to Professor Madsen for his work in connection with the standardisation of sera and serological tests, and to emphasise above all the importance of the results already obtained under his enlightened guidance following on the Technical Conference of Laboratory Workers at Copenhagen in November 1923. These results are of great importance from the point of view of public health."

The Committee then voted upon the following resolution composed of two parts:

> "The Health Committee,
>
> "After having read the report of its President, Professor Madsen, concerning the work of the Conference of Laboratory Workers held at Copenhagen in November 1923 on the standardisation of serological tests concerning syphilis:
>
> "Expresses the hope that the Medical Director, in transmitting this report to the various national health authorities, will draw their attention to:
>
> "(1) the following conclusion contained in the report:
>
> "*'The several methods for the serological diagnosis of syphilis should only be carried out in laboratories specially adapted to the purpose and by experienced workers,* as it has been shown that, even under the favourable conditions of the Conference, individual investigators exceptionally obtained incorrect results with one or the other method. Such results were only recognisable through the great number of controls and render it strongly advisable continually to employ numerous control sera. As, however, the final verdict in regard to serological methods is based on clinical investigation, it is to be emphasised that *pathologists who are concerned in such investigations should work in collaboration with the clinician.'*
>
> "(2) the necessity of concentrating in specially organised laboratories the examination free of cost to the patient, of the blood of persons suffering from syphilis, as well as to the necessity of technical guarantees being given by these laboratories to the health organisations of the State."

The first part of the resolution was unanimously adopted.

Paragraph 2, with Dr. Pittaluga's amendment to substitute the words "technical guarantees" for the word "control", was adopted by six votes to four.

The PRESIDENT thanked his colleagues for their kind appreciation of the work done in connection with serological tests. He would be very pleased to consider the question of an investigation regarding anti-anthrax and anti-melitococcal sera. It appeared that these investigations would mean considerable expense, and the financial side of the question would have to be considered.

Investigations concerning anti-streptococcal sera would be of use, but they would be very costly if they were to be carried out to any great extent.

The President understood that he was authorised by the Health Committee to convene the necessary technical conferences during the year 1924, and, further, that the report of the Copenhagen Conference was adopted, as well as that part of the Medical Director's report concerning it.

M. VELGHE asked whether it was understood that the conclusions relating to anti-tetanic and anti-diphtheritic sera would be forwarded to the Office international d'hygiène publique when they were in their final form.

Agreed.

TENTH MEETING

Held on Tuesday, February 19th, 1924, *at* 10 *a.m.*

Dr. MADSEN in the Chair.

41. Report of the Sub-Committee on Malaria (Annex 12).

Dr. LUTRARIO reminded the Committee of the circumstances in which the Sub-Committee on Malaria had been appointed. On the suggestion of Colonel James, Sir George Buchanan had proposed that an enquiry should be undertaken regarding the incidence of malaria and the prophylactic methods used against the disease. The Provisional Health Committee, struck by the serious facts brought to its knowledge, particularly with regard to Eastern Europe, appointed a Sub-Committee on Malaria, which was composed of Sir George Buchanan, Professor Léon Bernard and Dr. Lutrario. The resolution drafted by Professor Léon Bernard to this effect had been unanimously adopted by the Provisional Health Committee during its sixth session.

The Sub-Committee was authorised to procure the assistance of technical experts. It had met in Paris on June 6th, 1923, for a preliminary exchange of views, and had appointed as experts Colonel S. P. James, Professor Marchoux and Dr. Labranca.

Mr. Sydenstricker, member of the Health Section of the Secretariat, and Dr. Lutrario had a conversation in Rome in regard to the framing of a questionnaire. Agreement was reached on certain terms of reference of the questionnaire.

On August 1st, 1923, there had been a new session of the Sub-Committee in Paris, which was attended by the experts. The Sub-Committee recognised that, in accordance with the duties with which it had been entrusted, it was required to undertake a thorough examination of the problem. The first step was to frame a very complete questionnaire dealing with all the scientific and practical aspects of the problem.

Two draft questionnaires were under consideration, one which was extremely detailed and the other abridged. Professor Léon Bernard expressed the view that the questionnaire could not be too detailed. The speaker had himself pointed out that in certain countries it would be difficult to reply to a very detailed questionnaire. The Sub-Committee considered that if certain countries were unable to reply completely to a detailed questionnaire, this was no reason why detailed replies should not be forthcoming from other countries which were in a position to give the necessary information. It was argued that the task of the health administrations would be facilitated by the assistance of the experts. The detailed questionnaire was therefore accepted by the Committee.

The Sub-Committee had subsequently undertaken to draw up a plan of action. The proposal was to address the questionnaire to the interested countries, explaining in a covering letter the object of the enquiry and the part to be played by the experts who, appointed by the interested countries or sent by the Health Section, were to assist the health administrations in collecting the information in conformity with the questionnaire. It was understood that the Health Section would subsequently centralise the information thus collected and prepare a general report, after which the Sub-Committee would meet again in order to submit proposals for the best prophylactic methods and to reply to any questions which might have been raised.

The Sub-Committee during its session in Paris had recognised the necessity of drawing the attention of the health administrations to the following point: was it a fact that malaria was on the decrease or that it had disappeared in spite of the continued presence of the Anopheles ? It was noted that in certain regions of Italy there were anophelines but there was no malaria.

Meanwhile, at the request of the Albanian Government, Dr. Haigh had been sent on a mission to study malaria in Albania. His extremely interesting report had been communicated to the members of the Committee.

The Sub-Committee had invited Colonel James to undertake an enquiry in Great Britain, the Netherlands and Denmark. His report had not yet been communicated. The Health Section had been invited in the autumn of 1923 to make informal representations to certain Governments, asking them whether they were prepared to collaborate in the enquiry into malaria.

The Sub-Committee on Malaria, being of the opinion that it was necessary to take energetic action, had drawn up a plan of work similar to that which had been sketched in Paris.

There was, however, another very important question, that of quinine. The basis of prophylactic measures against malaria was quinine. If permanent results were desired, a very complicated programme would have to be realised. Local conditions would have to be improved, sanitary works undertaken, and medical assistance organised. Only quinine, however, could give immediate perceptible results. This was the first weapon. It did not appear, however, that there were sufficient quantities of quinine in existence to struggle effectively against malaria.

The figures collected by the Health Section, as well as the information contained in Dr. Druetti's report on the cultivation of cinchona and the production of quinine, showed that this production was in the hands of some fourteen factories, which produced annually some 600 tons. Although the two factories in British India and the factory in Japan produced about 100 tons yearly, this amount could not be included in the world production, as it was exclusively allocated to the needs of the two countries in question. In Italy the manufacture of the quinine necessary for the needs of the country would shortly be undertaken. The net available production of the world was accordingly some 500 tons, and many competent persons thought that this amount was insufficient.

Nevertheless, it was difficult to calculate the necessary quantity. The Medical Director had contemplated the convening of an international conference at which all the health administrations would be represented. It would have to examine the measures to be taken in order to obtain a sufficient production of quinine and to establish depots of cinchona seeds to meet the needs of the countries requiring quinine.

This scheme of an international conference was an interesting one, but it would be difficult to increase by this means the cultivation of cinchona. The Italian Government had undertaken in 1913 and 1914 an enquiry with the object of discovering whether it would be possible to establish plantations in the Italian colonies. The experts who had undertaken the enquiry had found in Erythrea a favourable zone 10 km. broad and 200 km. long, situated from 1000–2000 metres above the sea. This zone fulfilled all the necessary conditions. There were also reservoirs above this zone in case there should be insufficient rain. In spite of such favourable circumstances, it had not been possible yet to carry out this plan.

It was also an open question whether the Governments would be ready to advance money for the expenses of an international conference. In any case, however, the problem of quinine had been raised and would have to be solved.

This problem was not only one of quantity, but also of price. The raw material which Italy bought before the war from the Netherlands had cost from 11 to 12 florins a kilogramme, but since the war the price had risen to 40 florins per kilogramme in 1920. One gramme of quinine, which had cost 8 centimes before the war, now costs 45 centimes. Was there a practical means of increasing the production of quinine and at the same time reducing the price ?

In Italy numerous experiments had been carried out regarding cinchonine, and Colonel James in his report referred to investigations into other alkaloid derivatives of quinine. It was very important that these investigations should be continued. Investigations carried out in Rome proved that it was very often possible usefully to replace quinine by cinchonine, and if this were done on a large scale it would be possible, leaving on one side the question of plantations of cinchona, to increase and even treble the quantity of the precious remedy for malaria.

To sum up, the Sub-Committee had done its best to fulfil the task with which it had been entrusted. The questionnaire which it had drawn up proved a good basis for collecting comparable data. A plan of procedure had been established. The mandate of the Sub-Committee was now coming to an end and it would be the duty of the Health Committee, which was continuing the work of the Provisional Health Committee, to establish a new Sub-Committee.

The PRESIDENT, in the name of the Committee, thanked Dr. Lutrario and his colleagues for the work which they had brought successfully to a conclusion.

Dr. PITTALUGA congratulated Dr. Lutrario on his clear and sound statement. He felt authorised to accept in the name of the Spanish Government the conclusions of the Sub-Committee on Malaria. The health administrations of the Spanish Government, so far as they were concerned, would undertake an enquiry on the basis of the remarkable questionnaire drawn up by the Sub-Committee on Malaria. The question of malaria was of great importance in Spain, where the morbidity due to this disease was still high. Spain produced no quinine and, in accordance with the Customs statistics, the quantities imported amounted to about 6,300 kg. in 1922, while the quantity necessary to meet the requirements of the country from the prophylactic point of view was 15 tons.

He asked whether the questionnaire was to be sent directly to local doctors, or whether it was preferable to leave a little more freedom to the health administrations of the different countries for the collection of data relating to malaria and their subsequent adaptation to meet the requirements of the questionnaire.

Dr. JITTA associated himself with the congratulations which had been addressed to the Sub-Committee on Malaria. In the Netherlands, above all in the northern districts, a breeding-ground of malaria existed, regarding which a report would be furnished by Colonel James.

The Press in the Netherlands had given an account of the work of the Health Committee, and had mentioned the fears which had been expressed regarding the insufficient production of quinine. In this connection, Dr. Jitta read a letter which he had just received from an Association of Quinine Manufacturers in the Netherlands. The letter explained that, before the war, the price of quinine had diminished so much that plantations of cinchona had been replaced by other plantations, such as tea. Later, however, the price of quinine having increased, the cultivation of cinchona had been renewed, and the Dutch manufacturers at the moment possessed a sufficient stock to satisfy all the needs for quinine.

In the Netherlands, quinine was distributed free of charge to poor persons and at very reduced prices in the dispensaries. It was taken in the form of tablets, but care was necessary to ensure that these tablets were soluble.

Dr. Haigh's report showed that quinine was employed as a prophylactic in Albania. This was not the case in the Netherlands. The conditions were perhaps different in Albania, but

it was evident that, in order successfully to struggle against chronic malaria, it was necessary to improve the conditions of the country.

Recourse had sometimes been had to the spraying of streams with petrol, but it had not been possible to pursue this method in the Netherlands where the streams were used for watering the cattle. Experiments with paraffin were being carried out at present, as this reacted upon the larvæ but had no effect on fish or cattle.

Sir George BUCHANAN referred briefly to the methods adopted in the United Kingdom to deal with malaria after the war, as described in the reports of the British Ministry of Health.

He agreed that it was desirable to arrange for the continuance of the work of the Sub-Committee. It was all very well to have "correspondent malariologists" in each country, but it was necessary to have some central expert body to act as the brain of the Health Organisation in this correspondence. The proposed Sub-Committee ought also to advise and direct the work of medical officers who might be sent to make enquiries for the League in particular countries, as, for example, in Greece or Albania. It was also desirable that expert malariologists, who were familiar with this problem in the Far East, should be invited, when they came to Europe, to meet the central body and to contribute experience which could not otherwise be obtained.

The Sub-Committee should be as fully qualified as possible in malaria. Personally, he would ask leave to retire in favour of some member of the Committee who had special knowledge of this subject. It seemed desirable also to add to the Sub-Committee a few experts on malaria from outside the Health Committee.

The question of the world production of quinine was also extremely important. He did not think that it was yet proved to be necessary to convene a large conference, and it might be sufficient to call a small meeting of men familiar with the subject. It was pleasant to find the Committee encouraging the production of valuable drugs instead of discussing their prohibition.

Finally, he would be glad of information on the measures proposed for dealing with the requests received from Albania and Greece.

Professor Léon BERNARD, as a member of the original Sub-Committee on Malaria, wished to associate himself with what Sir George Buchanan had just said. It was desirable that the experts on malaria who were members of the Health Committee should sit on the Sub-Committee. He had, in the first place, objected to his own appointment, for he had no special competence in regard to malaria. He was, however, keenly interested in the work of the Sub-Committee, and would leave the Sub-Committee with regret. He would, however, continue to follow its work with the help of the reports which would be published.

It would assist the work of the Sub-Committee if Sir George Buchanan and himself were replaced by experts, and he would urge the advantage of retaining Professor Marchoux, who was an expert in malaria and who had gone to considerable trouble in order to collaborate in the work of the Sub-Committee, in which he took a keen interest. He put forward this suggestion as a matter of courtesy; now that the work had begun, it would scarcely be fitting for the Sub-Committee to deprive itself of the collaboration of so distinguished a person as Professor Marchoux.

Dr. RAJCHMAN said that he would first reply to the questions which had been raised by Sir George Buchanan. The Albanian Government had asked the Health Committee to make an enquiry into malaria in Albania, and to propose measures for dealing with the problem. Dr. Haigh had been sent to Albania, but had only made a short stay of five or six weeks, and he had therefore been able to do no more than prepare a preliminary report. Six months at least were necessary in order to draw up in collaboration with the Albanian Government a plan of work. In this connection the Medical Director referred to a letter from the Albanian delegation to the fourth Assembly (Annex 12 a) in which it was requested that a medical adviser might be sent to Albania for a time, to collaborate with the local autorities and the people in the campaign against malaria. The Sub-Committee on the budget had put aside a credit for the continuation of the enquiry. The Health Committee would have to authorise the appointment of an expert to carry on the investigation.

The problem of malaria was very important in Greece. Indeed the Greek Ministry of Health had sent a letter to the Secretary-General of the League (Annex 12 b), asking that a mission should be sent to Greece to enquire into the prevalence of malaria in that country. Very interesting work had been done and enquiries made during the war by the Allied Expeditionary Forces and by the German Armies. Very little, however, had been done since. The Commissioner attached to the Epidemic Commission in Macedonia had not found a very well-developed organisation. It would accordingly be necessary to collect information, whether published or not, and to send an expert to the spot for several weeks before a plan of investigation could be prepared. Perhaps the Committee would be willing to authorise Dr. Norman White to go to Greece.

Persia was an unknown quantity in this connection. A pressing demand had been addressed to the Committee by the Persian Government (Annex 12 c). The Persian Government had given striking proof of its good-will when the Council of the League of Nations had made an appeal on behalf of the campaign against typhus in Eastern Europe. It would therefore be very difficult to refuse the request which Persia had sent to the Committee. It was, however, impossible to form any idea of the extent of the problem. Perhaps the Committee would authorise him to send to Teheran the expert who had been asked to investigate plague in the Kirghiz Republic. This expert might examine not only the extent of malaria in Persia but also the incidence of other epidemics and, particularly, epidemics due to the pilgrimages.

There remained the last recommendation for the convening of a Government conference regarding quinine. It would be noted with satisfaction that the manufacture of this product had increased, but, unfortunately, the price had not been reduced in proportion. The costs of the conference could not possibly be very considerable. They would, moreover, be covered by the participating Governments, and only the expenses of organisation and of the Secretariat would be charged to the League of Nations.

The Sub-Committee on Malaria might examine the question of the date of the conference and its method of convocation; it could also study, in advance, the programme of the conference with the assistance of experts. He thought it would be sufficient merely to invite to the conference the countries of Europe and of the Mediterranean.

He would like to deal with two other points: (1) the systematic enquiry concerning the incidence of malaria, and (2) the investigation into the epidemiology of malaria. He did not know what method the Sub-Committee intended to follow, but he would like to ask whether its Chairman would agree to limit the despatch of the questionnaire to the countries affected by malaria.

It might, at the same time, be desirable to get into touch with the "correspondent malariologists" and to send them the questionnaire. If the questionnaire were merely sent to official authorities without its being known who would be responsible for receiving and dealing with it, it was to be feared that complete replies would not be received, in view of the fact that the questionnaire was extremely detailed.

In several countries it would probably be impossible for health administrations to give replies, even of an approximate nature, to all the questions. The questionnaire could hardly do more, as regarded these countries, than serve as a general guide.

With reference to the epidemiology of malaria, the Sub-Committee would perhaps think it advisable to convene the experts on malaria to draw up a programme of research; it might be possible to combine a meeting of the expert correspondents with the interchange of malaria specialists.

This interesting programme could scarcely be completed in 1924, but he thought he might assure the Committee that it would receive the support of the Assembly.

Dr. LUTRARIO, on behalf of the Sub-Committee, thanked his colleagues for their appreciation of the work which it had done. Professor Pittaluga had asked whether the questionnaire should be addressed directly to practitioners or whether the health administrations and experts should make a preliminary selection of the questions to be distributed. The Sub-Committee would have preferred to undertake an enquiry in order to collect information direct from the various administrative bodies, but as this procedure was likely to be slow and costly, it had adopted the view that the questionnaire should be sent as a guide for the experts and for the health administrations.

A very interesting example had already been furnished. Dr. Haigh had made a report on his investigations in Albania. This report had been arranged by the Health Section, so that it now replied to the majority of the questions in the questionnaire, though certain replies were lacking. As regarded the questions to which replies had been received, comparative data were thus secured.

Dr. Jitta had referred to the question of the solubility of the quinine tablets. Tablets were manufactured in Italy with sugar, but it had been found that they frequently failed to dissolve. A small quantity of starch had accordingly been added to the sugar, with the result that when the sugar came in contact with the gastric juice, the tablets swelled, broke up, and the quinine could then be absorbed.

Dr. Jitta had asked whether quinine was employed as a prophylactic. As regarded Italy, the answer was in the affirmative where prophylactic measures were used to protect workmen. There were two methods of administering the quinine — daily, in small quantities, or weekly in larger quantities. These methods were very successful if properly supervised, but it occasionally happened that healthy workmen did not take preventive quinine but sold it to purchase alcohol or used it to fatten their cattle.

In order to improve the conditions, marshes and water to which mosquitoes could gain access were sprayed with petrol, stocked with fish, birds, etc. The school established at Nettuno contained examples of every possible method.

He wished to associate himself with the proposal made by Sir George Buchanan and Professor Léon Bernard, regarding the addition of malariologists to the Sub-Committee on Malaria. Personally, he was unable to make any proposal, for the question was very delicate and he was one of those interested in the matter, as were his colleagues on the Sub-Committee. He noted what had just been said regarding the conference to consider the question of quinine, but he feared that it would prove very costly. Conferences of this kind followed one another too quickly and the expenditure incurred was heavy, especially for the country in which they were held.

With regard to epidemiological work on malaria, the Medical Director had proposed that correspondent malariologists should be summoned to a meeting in accordance with the method followed in respect of serological research work. This would be a very useful method of procedure, and it would thus be possible to give instructions to experts for their guidance. It would, however, be of use if this meeting could coincide with the interchange visit in order that specialists taking part in the interchange visit might see the methods applied.

The PRESIDENT said that the various statements which had been made indicated that the Committee approved of the principle of the Sub-Committee's report, of the results which it contained, and that the Sub-Committee should be left to carry these proposals into effect.

Agreed.

The Committee also decided to approve the proposals made by the Medical Director regarding the enquiries to be carried out in Albania, Greece and Persia.

On the proposal of the PRESIDENT, *the Committee decided that the Sub-Committee on Malaria should be composed as follows:*

Dr. LUTRARIO (*Chairman*), Dr. NOCHT, Dr. OTTOLENGHI, Dr. PITTALUGA, Dr. RAYNAUD.

Colonel JAMES and Professor MARCHOUX would be attached to the Sub-Committee as experts.

Dr. LUTRARIO hoped that Dr. Labranca would not be forgotten. He might act as correspondent malariologist, as was provided for in the resolution.

The PRESIDENT agreed.

42. Report of the Sub-Committee on Waterways.

Dr. LUTRARIO said that the draft convention approved by the Health Committee during its session of May–June 1923 had been submitted to a Mixed Sub-Committee composed of members of the Health Committee and of the Advisory Committee on Communications and Transit. This Mixed Sub-Commitee had made certain formal amendments to the draft convention, and also other amendments of principle. Among these latter some were acceptable, others ran counter to the directing principles of international conventions. Dr. Lutrario had got into touch with the head of the Transit Section of the Secretariat, but the latter had not wished to take the responsibility of modifying the text of the Mixed Sub-Committee. Perhaps this Mixed Sub-Committee might meet during the next session of the Health Committee.

Dr. CHODZKO regretted that he was unable to share Dr. Lutrario's views regarding the procedure to be followed. The Mixed Sub-Committee had always requested a preliminary opinion from the Health Committee. In order, therefore, that no delay should occur, the Health Committee should express an opinion on the question of the proposed amendments to the convention. When that had been done, the Mixed Sub-Committee could meet; otherwise, it could only refer the matter back again to the Health Committee.

Dr. LUTRARIO said that he would bow to the decision of the Committee, but he feared that the Mixed Sub-Committee would not agree with the Health Committee's views, and in that case the Health Committee would be obliged to refer the text back again to the Sub-Committee.

Sir George BUCHANAN, referring to a passage in the report in which it was stated that the wording of Article 1 would be appropriate either for a general convention or for a model convention, pointed out that when the proposal for a Mixed Sub-Committee was first moved, and also when the report of the Mixed Sub-Committee came before the Health Committee, it was clearly understood that the convention in question would only be a model convention. This was an important distinction. There were rules applicable to European rivers which were not necessarily applicable to other waterways. States could take a model convention and extract from it the provisions which seemed desirable and practicable. The text of the convention which was ultimately adopted might be different from the model or might contain only selected articles of the model. Those experienced in sanitary administration would probably agree that imperfect regulations which were observed in practice were of greater value than a more complete code which, in fact, was not applied. The Health Committee could provide a model convention containing clauses which were both satisfactory and practicable from the health point of view; the Committee, however, could not propose a general convention without sacrificing everything to academic theories.

He would point out as regarded procedure, that once again it appeared that the appointment of a Mixed Sub-Committee was not a very satisfactory method of dealing with such questions. The present Mixed Sub-Committee ought to be responsible to the Transit Committee or to the Health Organisation, but not to both.

M. HAAS, Secretary-General of the Advisory Committee on Communications and Transit, explained that the question whether the draft convention would become a model convention or would take the form of a text suitable for a general convention had been left for the decision of the conference, or for the organisation which would have to take a final decision regarding the text. The draft could be changed in accordance with one or other of these alternatives, for it in no way prejudiced the question, which was outside the scope of the Mixed Sub-Committee, but which was of particular interest to health specialists.

Dr. LUTRARIO thought that if it were a question of drafting a model convention, this should be more in conformity with Article 53 of the International Health Convention. He thought it would be preferable to postpone the remainder of the discussion to the following meeting.

Sir George BUCHANAN thanked M. Haas for his explanation, but said that his personal difficulty still remained. He could support the draft which was before the Committee as a model convention, but not as the basis of a general convention.

M. VELGHE said that the Committee should, above all, bear in mind the end which it was desired to reach, namely, that the greatest number of States possible should agree to the draft convention. It was to be feared that this end could not be reached without serious difficulty if it were proposed to arrive at once at a general convention, for a theoretical text always came into conflict with the actual regulations in force in certain countries, and the larger the number of countries which participated in the conference the more difficult it would be to reach an agreement. If, on the contrary, all that was necessary was to draft a model convention, it was to be hoped that certain neighbouring countries would more easily be able to conclude agreements based on this model. After a certain number of years, a number of countries, it could be hoped, would have concluded amongst themselves conventions on the lines of the model convention. When this had been done, it would be possible to contemplate the conclusion of a general convention, and in this way the final end would be attained more rapidly than if the Committee endeavoured to bring about the conclusion of such a general convention at the moment. He therefore agreed with Sir George Buchanan's proposal.

The Committee decided to continue the discussion at the next meeting.

ELEVENTH MEETING

Held on Wednesday, February 20th, 1924, at 10 a.m.

DR. MADSEN in the chair.

43. Approval of the Minutes of the Ninth Meeting.

The Minutes of the ninth meeting, were adopted.

44. Budget of the Health Organisation.

M. VELGHE, Chairman of the Sub-Committee on the Budget, submitted the Sub-Committee's report concerning the budget for 1924 and the estimates for the financial period of 1925 (Annex 13).

M. Velghe explained that the budget for 1924 had been fixed by the Assembly but that it had been necessary to distribute the sums of money placed at the disposal of the Health Section among the different enquiries and the other duties of the Health Section. The Health Committee had already, in plenary meeting, discussed certain items of the budget, including, for example, the item concerning cancer. Requests for funds submitted by the different Sub-Committees amounted to 300,000 francs, but the budget only made provision in this connection for 220,000 francs. It was, therefore, necessary, in order to balance the budget, to make certain reductions. The Cancer Sub-Committee, for example, had expressed itself ready to accept only 38,000 francs, and it was hoped that this sum would be sufficient for the work of the Sub-Committee for this year.

The total budget of the Health Organisation for 1925, which was to be submitted to the League of Nations, amounted to 1,458,964 francs, from which the three Rockefeller grants, amounting to 590,160 francs, would have to be deducted. The sum, therefore, to be granted by the League was 868,804 francs— that was to say, an addition of 216,184 francs on the previous budget. The four chapters of the budget were as follows:

1. Secretariat;
2. Epidemiological and Health Intelligence;
3. Health Committee and Conferences;
4. Interchange of public health personnel.

With regard to the Secretariat, the difference between the budgets for 1924 and 1925 was insignificant. As regarded the interchange visits, the difference was not very considerable, since the proposed increase was only 25,000 francs. The essential differences were to be found in the item for epidemiological intelligence and that for the Health Committee (sessions, special enquiries, technical conferences, etc.). All the proposals had been fully justified in the Budget Sub-Committee.

He hoped that the Health Committee would reach an agreement regarding the figures for the four items, so that it could be pointed out to the Assembly, especially as regarded item 3, that the credits requested were necessary if that body desired the Health Committee to cope with the important work which the latter had undertaken.

The Health Committee had decided to continue certain work: for example, the work on cancer and biological and serological research, all of which was of great interest. The League of Nations must be convinced by a unanimous vote of the Health Committee that the expenditure contemplated for biological and serological research, for epidemiological enquiries, for investigations into mortality statistics, for the work of the Mixed Health and Opium Sub-Committee and for the Sub-Committees on Malaria and Cancer, was absolutely indispensable in view of the importance which all these activities possessed from the point of view of public health. Any diminution of the sums required would hinder the Committee's activity.

The report of the Budget Sub-Committee was adopted without discussion.

45. Report of the Sub-Committee on the Epidemic Commission.

Sir George BUCHANAN, Chairman of the Sub-Committee, stated that the task of drawing up a resolution for submission to the full Committee had been almost nominal. The situation of the Epidemic Commission had been explained to the Health Committee in detail, and, in view of the fact that the important work with which the Commission had originally been entrusted was now at the end owing to lack of funds, the Sub-Committee, in its proposed resolution, had

only been able to express appreciation of that work and to refer to the lines of future activity which circumstances might permit.

The Committee had had submitted to it an interesting memorandum by Colonel Gauthier, representative of the Epidemic Commission in Greece, concerning vaccination by the mouth, and it had considered the report to be sufficiently important to recommend that it should appear as an annex to the Minutes of the Committee.

Sir George Buchanan read the following resolution, which had been drafted by the Sub-Committee:

The Health Committee:

"Approves the interim report on the work of the Epidemic Commission presented by the Chief Commissioner. The closing of the Warsaw Office marks the completion of the work for which the Epidemic Commission was primarily constituted. In expressing full approval of the manner in which that work has been carried out and of the results achieved, the Health Committee considers it desirable that a concise comprehensive report dealing with this phase of the Commission's activities should be prepared.

"Notes with satisfaction the resolutions adopted by the fourth Assembly of the League of Nations whereby the Epidemic Commission may be able to intervene in the event of an exceptional outbreak of disease of grave international importance;

"Notes with approval that the sum of 50,000 Swiss francs has been provided in the budget of the Health Organisation as a contribution to the Epidemic Commission to enable it to continue its epidemiological enquiries and investigations. It recommends the Epidemic Commission to utilise this sum to initiate, or to assist in, an enquiry into the outbreaks of plague reported from the Kirghiz Republic and the Kalmuk region of Russia, to co-operate in the epidemiological enquiries concerning typhus fever now being undertaken in Russia, and to continue its assistance with regard to cholera investigations in that country;

"Expresses its great appreciation of the work which has been carried out by the Epidemic Commission in Greece, and, in particular, of the interesting and suggestive report by Colonel A. Gauthier regarding the efficacy of the administration of vaccines by the mouth. It hopes that the work being done in Russia on similar lines with the help of the Epidemic Commission may throw additional light on this matter of great practical importance."

The PRESIDENT said that he had received from Colonel Gauthier a letter containing his views about vaccination by mouth and that he had expressed a wish to submit to the Health Committee a report giving his experience regarding this question. This letter has been submitted to the Committee. As, however, it had been impossible owing to pressure of time to fix a date for Colonel Gauthier to meet the Committee, the President could only distribute a memorandum which had been published by Colonel Gauthier in the *Bulletin of the Academy of Medicine*. The President pointed out that this interesting memorandum stated that experiments in vaccination by mouth undertaken by Colonel Gauthier had been carrried out with the approval of the Health Committee. He was not sure to what extent the Committee had actually approved.

Dr. RAJCHMAN recalled the fact that when the Health Committee had passed under review the work of the Epidemic Commission, it had expressed the desire that the experiments in question should not be made under its authority, and the Commissioners had received clear and precise instructions to this effect. Colonel Gauthier had been instructed to observe the results of experiments undertaken by the Greek health authorities, and, moreover, his report expressly emphasised this point. It would, therefore, perhaps be necessary to change a sentence in the memorandum in question.

The PRESIDENT stated that the experiments undertaken in connection with vaccination by mouth had been of great interest. He added that that part of the Medical Director's report concerning the activities of the Epidemic Commission paid a tribute to the remarkable work performed by Colonel Gauthier, Dr. Wroczynski and Dr. Haigh.

Dr. RAYNAUD pointed out that Colonel Gauthier's report mentioned anti-typhoid vaccination, about which he was preparing another report. In view of the importance of the question, he asked that Colonel Gauthier's new report should be sent to all members of the Committee as soon as it was published.

Dr. RAJCHMAN said that he would send to the members of the Committee all information concerning experiments carried out in this connection.

The Committee decided to adopt the Sub-Committee's report and resolution on the Epidemic Commission and that part of the Medical Director's report dealing with the question. It further decided to address special thanks to Colonel Gauthier, Dr. Wroczynski and Dr. Haigh.

Sir George BUCHANAN asked when the Committee would have submitted to it the summary of the report of the Epidemic Commission prepared by Dr. Norman White.

Dr. Norman WHITE hoped that this report would be ready in a few months.

46. **Report of the Sub-Committees on the Situation in the Far East.**

(a) *Report of the first Sub-Committee.*

Dr. JITTA, Chairman of the Sub-Committee, stated that it had reached positive conclusions and that it had been principally concerned with the two recommendations submitted by

Dr. Norman White in his report, the first concerning the establishment of an epidemiological intelligence bureau and the second the drafting either of a Sanitary Convention for Far Eastern States or of a new chapter to be added to the Paris Convention of 1912.

Dr. Jitta read the resolutions proposed by the Sub-Committee:

I. — "The Health Committee recommends the creation, in a Far Eastern port to be chosen by agreement between the Governments concerned, of a Bureau which would represent, for that portion of the globe, an extension of the Epidemiological Intelligence Service of the Health Section of the League of Nations. The Rockefeller Foundation might be asked to lend its assistance in the organisation of this Bureau. The Committee points out that the Far Eastern Association of Tropical Medicine has unanimously recognised the utility of such a Bureau.

"The Committee recommends that the Governments interested in the Far East shall be asked by means of an official letter from the Secretary-General to express their views on the proposal to establish a Bureau of Epidemiological Intelligence in the Far East, as well as on the place at which this Bureau should be established."

II. — "The Committee decides to recommend that the report of Dr. Norman White on his mission to the Far East should be forwarded through the Secretary-General to all the Governments of the countries of the Far East, with a request that they should formulate their observations on the draft Sanitary Convention contained in this report.

"The Committee instructs a Sub-Committee to examine the observations received and to prepare a general report on these for submission to the Committee at one of its later sessions. The Committee will forward the report subsequently to the Advisory Council for examination."

Sir George BUCHANAN accepted the French text of the resolutions with a reservation regarding the English text, which he had not yet seen.

Dr. JITTA read that part of the Sub-Committee's report which referred to the Epidemiological Intelligence Bureau for the Far East (Annex 4).

Professor Léon BERNARD proposed that the first sentence of Section II should read as follows: "In the Far East there are approximately 75 ports of sufficient (though varying) commercial importance to call for regular attention."

On the proposal of Professor Léon BERNARD, the English word "broadcasting", in the third paragraph of Section II, was placed in brackets and the letters T.S.F. were put before it.

On the proposal of Dr. CARRIÈRE, a verbal amendment to the French text of the report was adopted.

Dr. JITTA added that the Sub-Committee had paid tribute to the remarkable work of Dr. Norman White and that it had also been able on the previous day to obtain the opinion of Dr. de Vogel, former Director of the Health Administration of the Dutch Indies.

The report and resolutions of the Sub-Committee on the situation in the Far East were adopted.

On the proposal of the PRESIDENT, *the Sub-Committee for the Reception of the Observations of Governments concerning the Resolutions on the Far East was composed as follows:*

Dr. JITTA (Chairman), M. VELGHE, Sir George BUCHANAN, Professor JORGE, Dr. MIMBELA, Dr. RAYNAUD.

(b) *Report of the Scientific Sub-Committee.*

Professor JORGE submitted the Sub-Committee's report but pointed out that, in view of the divergences of opinion which had been manifested during the general discussion in the full Committee, the Sub-Committee's task had been somewhat delicate. It had thought it impossible to examine at length the problem of plague and to find a complete solution for it. It had, therefore, been content with drafting general proposals, which appeared to be the only possible proposals in view of present scientific knowledge. There were many questions regarding plague upon which light would still have to be shed, and fresh observations and research work were necessary.

After discussion, the Sub-Committee had put aside the various theories advanced, and Dr. Norman White had agreed that his own particular views should receive similar treatment. The task of the Sub-Committee had thus been simplified and it had confined itself to formulating succinct proposals acceptable to all. Professor Nocht, Professor Ottolenghi and Dr. Raynaud had reduced their theories to writing. The various texts had been compared, and, after discussion, Dr. Raynaud's had been selected to form the report of the Sub-Committee (Annex 14*a*).

Professor Jorge had drawn up a summary of what was known and what was still to be made known regarding plague. This memorandum, which had been approved by the members of the Sub-Committee, would supplement Dr. Raynaud's report.

The document was read (Annex 15).

The PRESIDENT said that the summary would be roneographed and circulated to the members of the Committee and inserted as an annex to the Minutes.

Sir George BUCHANAN enquired whether it was proposed to adopt the report and declaration of Professor Jorge. This report had necessarily been prepared somewhat hastily, and there had been no time for a careful consideration of many of the points which it contained. It might, accordingly, be dangerous to adopt the report as the considered opinion of the scientific

Sub-Committee, as in this case it would be taken as representing the final and considered views of the League of Nations.

If the report were to be adopted, it would be necessary carefully to examine the precise significance of certain passages. In this connection, he would like to know the exact significance of the statement to the effect that human plague was invariably a concomitant of rat plague. The statement to the effect that epizootic plague was disappearing also appeared to be somewhat sweeping. Further, the wording of the final paragraph seemed to be rather too categorical and imperative.

Professor Léon BERNARD said that scientists considered at the moment that animal plague formed the origin of every epidemic of plague, whether pneumonic or bubonic.

The PRESIDENT considered that Sir George Buchanan's statement proved that it was impossible in the time available to discuss Dr. Raynaud's and Professor Jorge's reports.

He proposed therefore that the Committee should simply take note of the two reports.

Professor JORGE pointed out that the two reports were no more than expressions of opinion by experts and would not engage the responsibility of the Committee. He explained that on page 3 of Document C.H.189 (Annex 14 a) the sentence "human plague is in all cases a concomitant of epizootic plague" meant that plague infection was carried by rats and that pulmonary cases were derived from bubonic cases.

Professor Léon BERNARD and Dr. RAYNAUD proposed two small drafting amendments.

Dr. Norman WHITE said he would like to thank the Committee for the compliments which had been paid to himself personally and to his report. He was glad that, in addition, there had been criticism of certain details, as this showed that the Committee was taking the report into serious consideration.

His suggestions for the classification of ports as infected or otherwise had raised a certain amount of criticism, more particularly the proposal that a port should be considered as infected if it harboured plague-infected rats. He would point out in this connection that careful attention should be paid to the results which would follow action taken after classifying such ports as infected. These results were less serious than was perhaps imagined.

He would like to thank Professor Jorge for his reception of the report. He had made no reference in that report to the work of Professor Jorge himself, as the latter had dealt exclusively with the problem as it arose in the ports of Europe and not in the ports of the Far East. Conditions in the Far East were entirely different.

He had been criticised for having given an arbitrary definition of an infected port, and it had been asked why he had decided that 25 cases of infectious disease a week should suffice to determine the "infected state" of a port and not, for example, 12, or some other number. He would point out that there were passages in his report which explained this figure. The figure, though arbitrary, was fixed as the result of a close examination of figures and charts which extended over ten years.

In presenting this report, he had endeavoured to express the views of the Far East, and he hoped that his report might be a basis for further action to improve the health conditions of countries of great importance from an epidemiological and from other points of view.

The PRESIDENT, in the name of the Health Committee, thanked Dr. Norman White for his remarkable report, which constituted an entirely new stage in the investigation into health conditions in the Far East.

The Health Committee adopted the report of the First Sub-Committee and took note of the report of the Scientific Sub-Committee in view of the fact that it had not had time to discuss that report in detail.

47. Report of the Sub-Committee on the Service of Epidemiological Intelligence.

Dr. JITTA, Rapporteur, submitted the Sub-Committee's report (Annex 16) and drew the attention of the Committee to the essential passage in the report "The proposals contained in the Medical Director's report are adopted, as is Mr. Sydenstricker's report as a whole".

In the name of the Sub-Committee he congratulated the Medical Director on the activity which he had displayed and on the results obtained. He also congratulated Mr. Sydenstricker and expressed the hope that he would return shortly to assist again in the work of the Health Organisation.

The report was read chapter by chapter.

Sir George BUCHANAN pointed out that, as regarded the final paragraph of the chapter entitled "Monthly Report", Great Britain was in a position to furnish the information contemplated yearly but not every quarter.

M. VELGHE explained the meaning of the paragraph. It did not mean that countries would be requested to furnish information every three months but that such information as had been collected should be placed in a quarterly report, to figure as an annex to the Monthly Report. The word "return" was replaced in the English text by the word "review".

On the proposal of Sir George BUCHANAN, it was decided to add to paragraph 5 of the report a special clause in the following terms: "A reservation is made concerning the decision on the investigation of the periodicity of influenza".

The report thus modified was approved (Annex 16), *as well as the corresponding part of the Medical Director's report.*

48. **Dutch Proposal concerning Quarantine Clearance of Ships.**

Dr. JITTA declared, in the name of his Government, that he was not opposed to the adjournment of this question as there was not sufficient basis for a discussion.

The discussion was adjourned.

TWELFTH MEETING

Held on Wednesday, February 20th, 1924, at 3.30 p.m.

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49. **Report of the Mixed Sub-Committee on Waterways** (*continuation of the discussion*).

Dr. LUTRARIO wished to give a short summary of this question for the benefit of those members who had not been present at the sessions of the Provisional Health Committee.

The proposal for a draft Health Convention concerning water transport had originated from the International Health Conference held at Warsaw in March 1922. The question was of great importance, for waterways were channels for the transmission and diffusion of infectious diseases. For the last sixty years efforts had been made to set up a system of health regulations for sea highways, but nothing had been done in respect of inland waterways. Nevertheless, it was possible to proceed from the Black Sea to the Baltic or to the English Channel and from the Atlantic to the Mediterranean by means of rivers and canals. Dr. Lutrario had drawn up a general plan of all cholera pandemics in Europe and he had thus been able to appreciate the important part played by rivers in the transmission of this epidemic.

The proposals of the Warsaw Health Conference had been discussed two months afterwards by the International Economic Conference at Genoa, which had passed a resolution on the subject. Dr. Lutrario read the resolution.

In view of this resolution, and in view of the fact that Article 53 of the International Convention of Paris, which entrusted the Governments of riparian States with the setting-up of a special health regime on the waterways, the Assembly of the League had submitted the question to the Provisional Health Committee. The Provisional Health Committee had appointed a Sub-Committee composed of Dr. Chodzko, Dr. Carrière and Dr. Lutrario, Rapporteur.

This Sub-Committee had reached agreement on the points on which it would be necessary to prepare a plan. It had fixed the general outlines of health regulations and of the investigations to be conducted concerning ships, crews, the destination and port of departure, and the organisations responsible for health control. It had taken the advice of experts and had drawn up a draft convention.

The Health Section had collected a very complete series of documents from Germany, England, Austria, Belgium and the United States. During its session held in January 1923, the Sub-Committee had met the representatives of the Advisory and Technical Committee for Communications and Transit and, with their assistance, had drawn up the general lines of a draft convention, which had been adopted without change by the Provisional Health Committee during its session in Paris in May 1923. The three members of the Sub-Committee had then formed, with certain members of the Transit Committee, a Mixed Sub-Committee on Waterways. This Mixed Sub-Committee had approved the draft convention with certain amendments of substance and certain drafting amendments. This draft convention had then been submitted to the Second General Conference on Communications and Transit held in November 1923 and had been adopted in the form in which it was annexed to the records of the Conference.

The formal amendments had been adopted without discussion. Of the amendments of substance, some had been accepted, but, concerning others, certain reservations had been made by the Sub-Committee of the Health Committee.

Dr. Lutrario added that the Sub-Committee was prepared to accept either a model convention or a convention of a general nature. Personally, he preferred the former.

He read the report of the Sub-Committee (Annex 17) and laid special stress on the articles of the draft convention concerning which reservations had been made by the Sub-Committee. The new Article 11 contained too general a reference to the distance to be covered. Each country should not be left to settle the question of these distances, for they might vary greatly. The proposed addition would meet the point.

In Article 13 of the new text, which was equivalent to Article 18 of the old text, that part of the sentence had been deleted in which the attachment to quarantine stations of bacteriological laboratories had been contemplated. The proposed addition would remedy this omission.

Dr. Lutrario said that in Article 18 the part concerning the necessity for the contracting parties to state without delay the sectors in which they had set up health control had been omitted.

Dr. CHODZKO pointed out that the text had been drawn up in accordance with the advice of the Transit Section of the Secretariat.

Dr. LUTRARIO said that the words "certain" or "suspect", which were to be found in all conventions, had been deleted. In view of the extreme importance of the question, which was

still further shown by Dr. Norman White's report, the Sub-Committee proposed that these words should be reintroduced.

In Article 20 (former Article 27) the Sub-Committee had agreed to re-establish the text providing that health supervision should be carried out on the lines laid down in all international conventions. It had, further, drawn attention to the benefits of preventive vaccination, without formally recommending it, in view of the fact that in certain countries vaccination was not compulsory. The former text provided for health passports and for the delivery of health certificates at the request of the persons concerned. The Mixed Sub-Committee had combined these two clauses into a single clause, in which it was stipulated that the delivery of a health certificate would be compulsory when the person concerned was under health control.

In the new text the former Article 31 had been deleted. The Sub-Committee proposed that it should be reintroduced and should figure as Article 28.

The new Article 33 provided for the supervision of ships on board which bad health conditions existed. The text had been redrafted by the Sub-Committee.

Dr. Lutrario thought that the text of the draft Convention, thus modified, which he hoped the Transit Committee would also adopt, would be of sufficient advantage to the cause of health and prophylaxis without injuring trade. In his opinion it would, indeed, be advantageous for trade, for by its adoption certain States would be able to dispense with the necessity of promulgating special regulations.

Sir George BUCHANAN said he had listened with great interest to the amendments presented by Dr. Lutrario. His own attitude to those amendments depended on the object of the Convention and on the form it would take. The Mixed Sub-Committee had considered that certain of the proposed regulations went too far in the demands which they made on commerce and traffic and had therefore thought it better to delete some of them.

If the Mixed Sub-Committee, in taking this view, had been considering particular river systems, it was probably justified. If, on the other hand, the Convention was intended to be a model Convention, the objections raised by the Mixed Sub-Committee were no longer valid A model Convention could be altered by the riparian States when they drew up a particular Convention to meet their special needs. If the Convention were intended to serve as a model, he thought the Committee might well accept the suggestions of Dr. Lutrario.

He would like to enquire as to the procedure to be followed in the event of the proposals of the Mixed Sub-Committee, as revised in accordance with the proposals of Dr. Lutrario, being adopted. Was it proposed to forward this draft Convention to the Governments for their consideration with a statement to the effect that the text in question had been considered and approved by the Health Committee ?

Dr. PITTALUGA asked what principles could form the basis for determining bad health conditions on board ships.

Dr. LUTRARIO replied that doctors in charge of quarantine stations would be entrusted with this work; moreover, the expression "health supervision" had always been inserted in previous conventions.

Dr. RAJCHMAN hoped that a reply would be given as soon as possible to the question put by Sir George Buchanan. There were two problems before the Committee of a somewhat different nature: (1) to reach a final conclusion regarding the work of the Mixed Sub-Committee; (2) the transmission of the model Convention to all Governments. The Mixed Sub-Committee had examined the scheme drawn up by the Health Committee. This scheme was not final, for the members of the Health Committee forming part of the Mixed Sub-Committee had not received a definite mandate from the Health Committee. For this reason, Dr. Lutrario had been compelled to ask the Committee's opinion on the amendments made in the text of the draft Convention.

It was, therefore, necessary for the Health Committee to express its opinion, and when that had been done the Mixed Sub-Committee should meet and have the opinion of the Health Committee put before it by Dr. Lutrario. Further, Dr. Lutrario, Dr. Chodzko and Dr. Carrière might enter into negotiations with the members of the Mixed Sub-Committee belonging to the Transit Committee in order to reach agreement. It was to be hoped that this agreement would be unanimous in order that the draft Convention might be sent to the Governments as soon as possible.

The question arose whether it was necessary to transmit the draft Convention for information to the Advisory Council before submitting it to Governments. This consideration would only arise if the Convention were a model one and not a general Convention. In any case, the draft Convention when sent to the Governments would have to be accompanied by an explanatory note.

Dr. CHODZKO supported the Medical Director's proposal. He, for his part, would be happy to receive definite instructions from the Health Committee in order to prevent the draft Convention being re-submitted by the Mixed Sub-Committee to the Health Committee.

Dr. LUTRARIO shared the views of the Medical Director and Dr. Chodzko. The differences in the text were of secondary importance. He hoped that after a conversation with his colleagues on the Mixed Sub-Committee who were members of the Transit Committee they would find themselves able to accept the proposed amendments; and even if they did not accept these proposals, the draft Convention would, at any rate, constitute a very interesting document.

Sir George BUCHANAN pointed out that the three members of the Health Committee who had sat on the Mixed Sub-Committee had agreed that the Convention was to be regarded as a model Convention. Would they, if they acted as plenipotentiaries of the Committee, present it to the Mixed Sub-Committee with a statement to that effect ?

There remained the question at what stage the work should be referred to the Office international d'hygiène publique. If the Health Committee had been taking up this matter *de novo*, it would undoubtedly be advisable for the text to be presented to the Office international before the model Convention was actually presented as a complete document. This work, however, had been undertaken by the Provisional Health Committee independently of the Office international, and it would, in these circumstances, perhaps be sufficient if the text were submitted when it was complete.

Dr. CHODZKO remarked that the title of the Convention "Standard Convention for Health Control" showed that there was no question of forming an international Convention.

Sir George BUCHANAN said he would like the Committee to decide whether it was dealing with a model Convention or a general Convention.

Dr. LUTRARIO was in favour of a model Convention.

Dr. JORGE said he would reserve his vote as he had not had sufficient time to study this very difficult question thoroughly.

The procedure proposed by the Medical Director was adopted.

The amendments proposed by Dr. Lutrario were accepted, together with the report of the Sub-Committee.

The members of the Health Committee who had served on the Mixed Sub-Committee received full powers from the Committee to negotiate with their colleagues on the Transit Committee.

The Committee declared itself in favour of a model Convention.

The PRESIDENT thanked the members of the Health Committee who had served on the Mixed Sub-Committee for the excellent work they had done.

50. Enquiry into the Position regarding the Teaching of Public Health in the various Countries.

Professor Léon BERNARD reminded the Committee that during the last session of the Provisional Health Committee the latter had undertaken an enquiry into health instruction in the various countries. He personally had been asked to undertake such an enquiry in France. He had complied with this request and sent a report to the Medical Director. He asked the Medical Director for information as to the position of the enquiry in other countries and as to whether there was any intention to pursue it further. He thought that the question was very interesting, especially as instruction in health matters was given very unequally in the various countries. The Czechoslovak Government had addressed an enquiry on this subject to the French Government and doubtless to other Governments. The connection between health instruction and progress in health questions generally was extremely close.

Dr. RAJCHMAN said that, during the fifth session of the Provisional Health Committee, Dr. Chodzko had proposed that the Medical Director should be invited to collect information on the arrangements made in the universities of Europe, America and Japan for the teaching of public health and preventive medicine, and to present a report on the question.

The Medical Director had addressed enquiries to the Governments of the following countries: Germany, Austria, Belgium, Brazil, Spain, the United States, Finland, France, Hungary, Italy, Japan, Poland, Portugal, Roumania, the Scandinavian countries, the Kingdom of the Serbs, Croats and Slovenes, Switzerland, and Czechoslovakia.

He had received the following replies:

Surgeon-General CUMMING had sent a paper entitled "The Training of Sanitarians in the United States".

Acting Surgeon-General Dr. Mark J. WHITE had sent a paper entitled "Education in Public Health in the Colleges and Universities of the United States".

Dr. KOBKINIES, of Finland, had replied in a short note.

Professor Dr. PRAUSNITZ, Dr. LODE and Dr. SCHATTENFROH, of Austria, had sent replies.

Professor Léon BERNARD had sent a report on health instruction in France, in the medical faculties and schools of the universities.

Dr. STAMPAR had sent a study on instruction in health and social medicine in the Kingdom of the Serbs, Croats and Slovenes.

Professor Dr. VON GROSZ had sent a reply from Hungary.

Professor Dr. Thomas JANIZEWSKI, of Cracow, had replied from Poland.

Further, Dr. FREY had been authorised by the German Government to make a report on the question, and M. de CAZOTTE, the Secretary-General of the Office international d'hygiène publique, had forwarded to the Health Section a report by M. CAVVADIAS on the teaching of medicine in Greece.

The question was of great interest, for various distinguished experts had applied to the Health Section for information on the subject.

M. KUSAMA said that no reply had been received from Dr. Miyajima; at the time of the fourth Assembly, M. Kusama had received information from Tokio to the effect that a preliminary enquiry had been made in Japan and that Dr. Miyajima had received material which would enable him to forward a report to the Secretariat in due course.

The PRESIDENT said that in Denmark, where public health was relatively well developed, health instruction was not on a level with the progress achieved. He thought it would be advisable

to entrust the enquiry to a Sub-Committee. The system of Sub-Committees had given excellent results, and experts might be associated with the work of a Sub-Committee.

Professor Léon BERNARD supported the proposal of the President. Although the Secretariat was quite capable of making a report on the question, its task would be considerably lightened if the preparation of the report were entrusted to a Sub-Committee. The question, moreover, was sufficiently important for this procedure to be applied.

Dr. RAJCHMAN said that the problem was extremely difficult and of great importance, and he supported the proposal of the President. The Sub-Committee might have the assistance of experts and present a report on the subject as a whole on the conclusion of its work, and might even present recommendations, which could not be done by the Secretariat.

The PRESIDENT proposed that the Sub-Committee should be composed as follows: Professor Léon Bernard, Dr. Chodzko and Dr. Madsen, with the Medical Director as Secretary. Further, he proposed that Professor Léon Bernard should be Chairman of the Sub-Committee.

These proposals were adopted.

Professor Léon BERNARD thanked the President for the honour paid to him, though he felt that the President of the Health Committee himself seemed to be the most suitable person to direct the work of the Sub-Committee. He would accept the chairmanship, however, as a tribute paid to the University of Paris.

As regarded experts, the question could not be dealt with now, when the Committee was just closing its session. He would, however, like to propose the name of an expert, which would naturally occur to other members of the Committee, owing to the magnificent work which he had done. He was alluding to the American, Professor Welch, who had created a unique School of Health at Baltimore with the assistance of the Rockefeller Foundation.

The Committee adopted with acclamation the proposal of Professor Léon Bernard.

The PRESIDENT thought that, as regards the appointment of the other experts, the procedure should be by consultation.

Dr. RAJCHMAN said that the invitation would be addressed to Professor Welch as soon as the Council had approved the report of the Health Committee.

Dr. CHODZKO thanked the President for having appointed him as a member of the Sub-Committee. He also thanked Professor Léon Bernard for the support given to his proposal during the fifth session of the Provisional Health Committee.

The following resolution was adopted:

> "The Health Committee decides to appoint a Sub-Committee to examine the documents already collected by the Health Section regarding instruction in health and social medicine in the different countries of Europe and of America and in Japan;
>
> "To continue this enquiry, making its scope as large as necessary;
>
> "And to make recommendations in favour of courses of study which in its opinion are most likely to yield the highest value in public health education both from the scientific and practical points of view.
>
> "This Sub-Committee shall be composed of Professor Léon Bernard (Chairman), Dr. Madsen and Dr. Chodzko. It may call in the assistance of suitably qualified experts at some future date. But at this stage, and in order to pay a unanimous tribute to the work done in this field by Professor W. H. Welch, Director of the School of Hygiene of the Johns Hopkins University, Baltimore, the Committee decides to request this scientist to lend his support in the capacity of expert by becoming a member of the Committee and thus adding the benefit of his authority and his experience."

51. Report of the Sub-Committee on Cancer.

The PRESIDENT informed the Committee that members of the Cancer Sub-Committee had reached unanimous agreement on a draft resolution.

Professor Léon BERNARD recalled the fact that it had been necessary to define the work of the Cancer Sub-Committee. A comparison of statistics for Great Britain and the Netherlands had shown a great difference in the mortality due to cancer of the breast and of the uterus. The Sub-Committee thought it of advantage to institute an enquiry into the causes of this difference and to make a study of methods based on that enquiry. Now that cancer had become a problem of public health to the same extent as tuberculosis and syphilis, it appeared necessary to widen the scope of the enquiry as soon as possible, and with this end in view it was proposed that a Cancer Sub-Committee should be appointed to deal with the problem as a whole. Nevertheless, as one special part of the problem was already under examination, and as the financial resources of the Committee were limited, the first step was to complete the work which had already been begun.

He desired to submit the following draft:

> "The Health Committee decides to appoint a Cancer Sub-Committee composed of Sir George Buchanan (Chairman), Dr. Lutrario, Dr. Jitta, Professor Léon Bernard and Dr. Carrière.
>
> "The first duty of this Sub-Committee will be to examine reports on the continuation by Sir George Buchanan, Dr. Lutrario and Dr. Jitta of the work undertaken by the former Cancer Sub-Committee with a view to discovering, by comparing the statistics of Great

Britain, Italy and the Netherlands, the cause of the difference shown to exist between the mortality returns of these countries in respect of cancer of the uterus and of the breast.

"At a later stage the Cancer Sub-Committee is empowered to extend its investigations into the epidemiology of cancer in general, as far as circumstances will permit."

Sir George BUCHANAN, in the name of his colleagues, thanked Professor Léon Bernard for having so clearly defined the situation. The members of the Sub-Committee had reached unanimous agreement. Before Professor Léon Bernard's motion had been read to the Sub-Committee he had prepared a rather more detailed text which included a statement of the history of the investigation in order to answer questions which were constantly asked regarding the reasons for the activity of the Cancer Sub-Committee. The two draft resolutions could be combined. Sir George Buchanan read the text which he had prepared:

"The Health Committee,

"Having considered the facts elicited by the enquiry into the significance of statistics of deaths attributed to cancer in different countries which has been instituted by the Office international d'hygiène publique, and the work relative to the explanation of these acts which has since been undertaken by the Sub-Committee on Cancer of the Provisional Health Committee of the League of Nations, as communicated to the Health Committee at the present session;

"Taking account of the great importance of studying the circumstances which are producing an increase in cancer mortality and the causes to which this increase is due, and taking account, further, of the fact that the investigations of cancer problems now taking place in many countries will be greatly aided by mutual understanding and comparison of the lines of investigation pursued and the results obtained:

"Considers that it is desirable that a Sub-Committee on Cancer should be charged with the duty of considering and advising on questions on which it appears that co-ordinated action in different countries for the investigation of the problem of cancer in any aspect can be most effectively obtained through the Health Organisation of the League of Nations.

"In view, on the one hand, of the wide terms of this reference, and, on the other hand, of the financial and practical considerations which must be taken into account, the Sub-Committee will be instructed to limit investigations involving charges on the budget of the Health Organisation to matters which have previously been carefully defined and for which a practical programme has been previously approved by the Health Committee.

"The Health Committee, considering that, from this point of view, the comparative enquiry into the causes of the disproportionate mortality from certain forms of cancer in Great Britain, the Netherlands and Italy is a matter of great importance, and one which requires action by the Health Organisation to be effectively carried out, and in view of the preparations for such investigations which have been so fully and carefully worked out by the Sub-Committee of the Provisional Health Committee, considers that the Sub-Committee should, as its first task, continue its investigations and report the results as early as possible."

Professor Léon BERNARD proposed that Sir George Buchanan's text should be added to the text of the draft resolution which he had submitted to the Committee, as an explanation of its terms.

Dr. CARRIÈRE said that since his name was found in the resolution he would be very happy to become a member of the Cancer Sub-Committee. The question was of great interest to him. He had undertaken an enquiry into the mortality due to cancer in Switzerland in the years 1900-1920, during which period the mortality had not shown any marked variation. He had examined the death certificates for 1920 in order to draw up statistics on the question and had undertaken an investigation into cancer of the breast during the years 1911-1915. The questionnaire had been sent to all doctors and hospitals. The material had not yet been studied, but the work would complete what was being done in Great Britain, the Netherlands and Italy.

The Committee decided to adopt the text proposed by Sir George Buchanan and to add the draft resolution proposed by Professor Léon Bernard, introducing it by the following words: "For these reasons the Health Committee decides..."

The PRESIDENT expressed the hope that the Cancer Sub-Committee would be able to do useful work notwithstanding the reduction in the funds at its disposal.

52. Report of Dr. Carozzi on the Activity of the Health Section of the International Labour Office and the Appointment of a Mixed Sub-Committee.

Dr. CAROZZI submitted a report on the activity of the Health Section of the International Labour Office (Annex 18) and drew special attention to the question of anthrax infection in the leather and hide industries. The Advisory Committee on Industrial Hygiene of the International Labour Office was of opinion that the most effective method of assuring the success of the investigations would be to form national committees, to which instructions would be given by the Health Committee of the League of Nations. A Mixed Sub-Committee should also be

appointed, consisting of six members: three appointed by the Health Committee of the League and three by the Committee on Industrial Hygiene.

The PRESIDENT was happy to note that a close collaboration had been established between the Advisory Committee on Industrial Hygiene of the International Labour Office and the Health Committee. He proposed that the Committee should now appoint three of its members to form part in the Mixed Sub-Committee.

Sir George BUCHANAN said that he had followed with interest the statement of Dr. Carozzi As he had already had occasion to say, however, during the session, he thought that the system of Mixed Sub-Committees was unsatisfactory and he hesitated to approve the creation of another. He did not oppose collaboration between the Advisory Committee on Industrial Hygiene and the Health Committee, but, in his opinion, the responsibility of the enquiry should fall on one or other of the two organisations. According to whether the medical or the industrial aspect of the question was the more important, the three members appointed by one of the two organisations should be attached to a Sub-Committee of the other organisation.

Dr. CHODZKO congratulated the Health Section of the International Labour Office on the work which it had done under the direction of Dr. Carozzi.

When the International Labour Office had taken up the question of anthrax infection in the leather and hide industries, it had first been considered desirable to draft a convention, but, for the moment, that idea had been abandoned. Could the proposals which had now been made be amended or completed ? In his opinion, it would be necessary to specify that the Health Committee, in choosing the members of the national committees, should consult the health administrations and the authorities entrusted with the supervision of labour.

Dr. Chodzko considered that the objections raised by Sir George Buchanan had much force, and, as in this question the medical aspect was of greater importance than the industrial, it would perhaps be better to appoint a Sub-Committee of the Health Committee, to which members of the Committee on Industrial Hygiene of the International Labour Office could be added.

Dr. RAJCHMAN pointed out to Sir George Buchanan and Dr. Chodzko that they were now before a *fait accompli*. Side by side with the Health Committee there existed the Committee on Industrial Hygiene of the International Labour Office. The question was to discover the means by which these two organisations could work in common, and an opportunity had now arisen to organise an effective collaboration. The Mixed Sub-Committee which was proposed could not be compared to other mixed Sub-Committees. The Mixed Sub-Committee on Waterways, for instance, and the Mixed Sub-Committee on Opium had been appointed in order to reconcile divergent interests, to prepare a report and to draft a convention. In the present case, however, the only duties of the Mixed Sub-Committee would be to continue research work, which would not engage the responsibility of the two organisations. These researches were similar to those carried out for biological and serological standardisation. The Health Committee and the Committee on Industrial Hygiene might include such investigations in their programme of work. At the moment, there was an excellent opportunity for the two organisations to work in common, and appeal should not therefore be made to precedents which, moreover, had been satisfactory.

Professor PITTALUGA stated that the question of anthrax was of great interest to Spain, and the health administration of that country was ready to put into practice any suggestions made.

He approved Dr. Chodzko's observations, since he thought that it would be better to stipulate that, in choosing the members of the national committees, the Health Committee should first reach agreement on the question with the authorities entrusted with the supervision of labour and with the public health authorities.

Sir George BUCHANAN said that even the persuasiveness of the Medical Director had not convinced him. The two organisations could work together, but the responsibility for the enquiry must be assumed by one or other of them. Taking into account the work proposed, he considered that the industrial aspect of this case was the dominant consideration. He recalled the fact that few questions had given rise to so many practical difficulties in Great Britain as those connected with anthrax.

Professor OTTOLENGHI was of opinion that the industrial factor was not, perhaps, the most important, for the problem was mainly one of hygiene. He knew from experience how difficult it was to secure the application, in industry, of any method of disinfection, there being a general belief that disinfection was a cumbrous and unnecessary procedure, since in tanneries cases of anthrax were comparatively rare and the serum treatment was available.

It was therefore quite natural, he thought, that the Health Committee should take a direct interest in a discussion which was so intimately connected with the health of the workers. The problem had never been satisfactorily solved — particularly from a practical point of view — even in Italy, where it had been taken up more than thirty years ago. As, moreover, they needed to consider not only which methods of disinfection were best, but also which of these methods could be most effectively and readily applied to industry, it was very probable that the object they had in view would be more speedily attained by a Mixed Commission, including representatives of the International Labour Office. He therefore supported M. Carozzi's proposal.

Dr. CAROZZI explained that collaboration with the Health Committee was indispensable. The question of principle was the first to arise. The International Labour Office did not concern itself with scientific questions. When the necessity was recognised it was instrumental in provoking enquiry, but scientific questions were reserved for the Health Committee. It was precisely because anthrax raised technical industrial questions that it was proposed to set up national committees to which instructions should be given by the Health Committee of the League of Nations.

He would point out to Dr. Chodzko that his report only contained general instructions, for account had only been taken of conditions in certain countries.

The work of the Mixed Sub-Committee would only involve very small expenditure at the outset. The Mixed Sub-Committee could meet either during the session of the Health Committee or during a session of the Committee on Industrial Hygiene.

The PRESIDENT understood the reasons for the fears expressed by Sir George Buchanan. He pointed out, however, that the Mixed Sub-Committee which it was proposed to appoint could not be compared with the Mixed Sub-Committees already established. He proposed that Dr. Carozzi's suggestions should be adopted and that three members of the Health Committee should be chosen to form part of the Mixed Sub-Committee.

M. VELGHE supported the appointment of a Mixed Sub-Committee. Questions were examined from different points of view in the League of Nations and it was important that its organisations should collaborate, to avoid their working separately on the same problem. If three experts of the Health Committee were placed at the disposal of the Committee on Industrial Hygiene, they would not be on quite the same footing as their colleagues in the work.

Dr. CHODZKO said that as his proposal did not appear to be acceptable he was prepared to agree with the general opinion of the Health Committee.

Sir George BUCHANAN agreed to the appointment of a Mixed Sub-Committee with the reserve that in his opinion the Sub-Committee ought to be established by the International Labour Office, which should take the responsibility of the organisation, and that the Health Committee should assist it by lending experts.

The Health Committee approved the appointment of the Mixed Sub-Committee and requested Dr. NOCHT, *Dr.* RAYNAUD *and Professor* OTTOLENGHI *to serve as members.*

53. Rules of Procedure of the Health Committee.

M. VELGHE, Rapporteur, emphasised the necessity of adopting rules of procedure for the Health Committee. Between two sessions of the Committee, the work would continue, and it was essential to avoid the necessity of consulting the Committee on every point.

The Sub-Committee on the Rules of Procedure had carefully examined each provision of the draft rules, and the Rapporteur was ready to give any explanation which might be desired.

The draft Rules of Procedure were read article by article.

The draft Rules of Procedure were adopted, with some formal amendments (Annex 19).

THIRTEENTH MEETING

Held on Thursday, February 21st, 1924, at 9.30 a.m.

Dr. MADSEN in the Chair.

54. Approval of the Minutes of the Tenth and Eleventh Meetings.

The Minutes of the tenth and eleventh meetings were adopted.

On the proposal of the PRESIDENT, the Medical Director was entrusted with the final drafting of the Minutes of the meeting of Wednesday afternoon, February 20th, and of the present meeting.

55. Report of the Medical Director *(Continuation of the discussion)*: Health in Mandated Territories.

Sir George BUCHANAN said that he would like to have some explanation concerning the duties of the Health Committee in connection with the territories under mandate.

He also asked that the Health Committee might be advised when the enquiry was undertaken regarding the varieties of rats and parasites in the Far East as contemplated in the Medical Director's report.

Dr. RAJCHMAN, referring to the second point raised by Sir George Buchanan, said that this enquiry could only be undertaken after the institution of the Far Eastern Epidemiological Intelligence Bureau, and that the Health Committee would certainly be advised when the work was begun.

As regarded the duties of the Health Committee in connection with territories under mandate, he would remind the Committee that the fourth Assembly had examined a proposal to the effect that the reports submitted to the Mandates Commission by the Mandatory Powers should be submitted to the Health Committee for any observations which the latter might wish to present, after studying the chapters dealing with questions of public health. The Assembly, after examining the question, had adopted the following resolution:

> "The Assembly is of the opinion that it would be desirable for all health reports presented to the Permanent Mandates Commission to be communicated to the Health Committee of the League of Nations for any recommendations it may desire to make to the Permanent Mandates Commission."

The Council had dealt with this question during its session of December 1923 and adopted the following resolution:

> "The Council concurs in the wish of the Assembly and instructs the Secretariat to take the necessary steps to secure its execution, it being understood that no departure shall be made from the recognised procedure."

As the Mandates Commission met only once a year (in June) it would be difficult for the Health Committee to express an opinion on the subject in 1924. He would suggest the appointment of a Sub-Committee to examine the health reports of the Mandatory Powers. In this connection, he recalled the fact that the Provisional Health Committee had appointed a Sub-Committee of experts to study sleeping-sickness. This Sub-Committee consisted of Dr. Andrew Balfour (Chairman), Dr. Gustave Martin, Deputy Director of the Pasteur Institute, Dr. van Campenhout, of Brussels, and Dr. Bagshaw, of London. This Sub-Committee had not yet finished its work and had not presented its final report. The Sub-Committee might perhaps examine the health reports of the Mandatory Powers.

The Medical Director suggested that one or two members of the Health Committee should sit on the Sub-Committee.

Sir George BUCHANAN thought that this was an excellent suggestion, but asked that the observations of the Sub-Committee should be communicated to all the members of the Health Committee some time before the session of the Committee in order that they might, if necessary, consult their Governments regarding these reports.

M. VELGHE thought that the decision of the Assembly to entrust the Health Committee with the examination of the health chapters of the reports of the Mandatory Powers was excellent. This was an important decision, which did not in any way infringe the autonomy of the Mandates Commission. Health questions were of considerable importance in Equatorial Africa, and the Sub-Committee should deal with the general health position in this part of the African Continent. It had, in fact, taken a step in this direction in the investigation which it had undertaken into tuberculosis and sleeping-sickness in Equatorial Africa.

The position in this part of the world was not very well known, but everything went to show that the population of Equatorial Africa was not increasing but was perhaps diminishing. This belief was based on opinions which had been put forward on several occasions. Certain parts of Equatorial Africa were uninhabitable by Europeans, and it was accordingly necessary to preserve the negro race in this part of the world. As regarded syphilis and sleeping-sickness, a simple solution might be anticipated, but as regards tuberculosis there was hardly any hope at the present moment, and it was to be feared that it would cause very serious ravages.

He accordingly expressed the desire that the Sub-Committee should deal with the question continuously and that the Health Section should collect all the relevant documents. The Health Organisation would thus render a service to the negro populations and to humanity at large.

On the proposal of the PRESIDENT, *the Committee decided to instruct the Sub-Committee on Sleeping-Sickness to study the parts of the reports of the Mandatory Governments relating to health questions. The Committee also decided that* Dr. JORGE, Professor OTTOLENGHI *and* Dr. GRANVILLE *should be added to the Sub-Committee.*

Dr. RAJCHMAN observed that as the Health Committee might not hold another session before the Assembly in 1924, the report of the Sub-Committee would be sent by post to members of the Committee, who would present their observations in writing.

The report of the Medical Director as a whole was adopted.

56. Invitations addressed to the Health Committee.

Dr. RAJCHMAN said that he had received three invitations in connection with the work of the Committee. One came from the League of Red Cross Societies asking that the Health Committee should send a delegate to the Second Eastern Conference of the Red Cross Societies which was to meet at Manila on April 1st, 1924. It was too late to send a representative to this Conference.

The second invitation came from the Governor of the Hawaian Islands asking that the Health Committee should be represented at the Pan-Pacific Conference on Preserved Food which was to be held in the summer of 1924. He had at once replied that the matter would be put before the Health Committee and had asked for additional information which he had not yet received. This Conference would certainly be very interesting from the general point of view.

Sir George BUCHANAN thought that if the Conference were sufficiently important the President might ask an expert attending it to act as representative of the Health Committee. By this means expenses would be avoided.

Dr. RAJCHMAN said that the third invitation had come from the American Medical Association, which would be holding a congress at Chicago from June 9th to 13th, 1924. The Association had asked the Health Committee to send charts, diagrams and statistics illustrating the activity of the Health Organisation in order that these activities might be explained to the Congress.

The Committee accepted this invitation.

57. Representation of the Health Committee on the Council of Governors of the School of Health in London: Letter from the British Foreign Office.

Dr. RAJCHMAN explained that the Secretary-General had communicated to him a letter received the previous evening from the British Foreign Office announcing that the British Ministry of Health had instituted a School of Health with a very extended programme of activity. This school would be administered by a Council of Governors composed of 34 persons appointed by various organisations (universities, ministries, etc.) and in particular by the Health Committee of the League of Nations. An executive Committee would be chosen from the Council of Governors The British Foreign Office was requesting the Health Committee to appoint a representative on the Council, and the Secretary-General had been requested to forward this request to the Committee.

The constitution of the Council of Governors apparently formed part of the conditions of the contract which had been made between the British Health Ministry and the Rockefeller Foundation.

The Secretary-General, with whom the Medical Director had discussed the question, was not *prima facie* opposed to the acceptance of the invitation of the Foreign Office by the Health Committee. If the Committee desired, however, the Legal Section of the Secretariat might study the question from the juridical point of view. The letter from the Foreign Office was not to be regarded as a formal invitation. A formal invitation would be addressed to the Committee when the Charter of the School of Health had been approved.

On the proposal of the PRESIDENT, *the examination of this question was postponed to the following session.*

58. Close of the Session.

M. VELGHE said he would like to congratulate the President for the tactful and amiable way in which he had directed the work of the session, during which he had had the full sympathy of his colleagues. All the members of the Committee were able to appreciate greatly the scientific distinction of Dr. Madsen and the thorough way in which he had studied the various problems before the Committee. On both grounds, gratitude was due to him. M. Velghe expressed the wish that Dr. Madsen might for a long while continue to preside over the Committee.

The PRESIDENT said he very much appreciated the kind words of M. Velghe. He would like to thank M. Velghe and all his colleagues for the collaboration which they had afforded him. The Committee had worked in a spirit of complete co-operation, and he was convinced that it had done useful work, that it had taken an appreciable step forward and had fully justified its existence and the existence of the Health Organisation of the League of Nations.

New fields of activity were opening before the Committee as a result of the mission to the Far East, and it was possible to be confident for the future. If the Committee could feel such confidence in the future, that confidence was due in the first place to the Medical Director. Those members of the Committee who had been members of the Provisional Health Committee knew this already, and the new members had, during this first session, had the opportunity of appreciating his energy, his clearness of mind and his organising capabilities.

The Medical Director had inspired the whole of his staff with these qualities, for the Secretariat of the Committee had given so many proofs of admirable work, as well in the preparation for the session as during the session itself. The entire agreement and the close collaboration which now existed between the Office international d'hygiène publique and the Health Committee was an excellent augury for the future. He would like in this connection to pay a tribute to M. Velghe, Chairman of the Office, whose distinguished position before the creation of the Health Committee had received still further importance since its creation. His great loyalty and his keen desire always to find an equitable solution for each question, without taking into consideration any other motive than the importance of the question from the public health point of view, had been highly appreciated by everyone, and his wide administrative experience and his wisdom had much enhanced the authority of the Health Committee.

59. Telegram of Sympathy to Dr. Granville.

On the proposal of the PRESIDENT, *the Medical Director was instructed to send a telegram of sympathy to Dr. Granville.*

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Annex 1.

AGENDA OF THE FIRST SESSION OF THE HEALTH COMMITTEE OF THE LEAGUE OF NATIONS.

Approved by the Committee on February 11th, 1924.

1. Election of President.
2. Designation of the four additional Members of the Committee.
3. Report of the Medical Director:
   (*a*) General Activities of the Health Organisation.
   (*b*) Service of Epidemiological Intelligence and Public Health Statistics.
   (*c*) Epidemic Commission.
4. Report of the Opium Sub-Committee.
5. Report of the Mission to the Far East.
6. Report on Serological Investigations.
7. Report of the Conference on and Investigations regarding Biological Standards.
8. Report of the Cancer Sub-Committee.
9. Report of the Malaria Sub-Committee.
10. Report of the Waterways Sub-Committee.
11. Report of the Sub-Committee on the Dutch Proposal concerning "libre pratique" in Ports.
12. Report presented by the Chief of the Section of Industrial Hygiene, International Labour Office.
13. Miscellaneous:
    (*a*) Draft Rules of Procedure.
    (*b*) Requests for Representation at Conferences, etc.
    (*c*) Request of the Turkish Government for the designation of six Advisers.

Annex 2.

REPORT OF THE MEDICAL DIRECTOR ON THE GENERAL ACTIVITIES OF THE HEALTH ORGANISATION FROM JUNE 1923 UNTIL JANUARY 1924.

Submitted to the Health Committee on February 11th, 1924.

A. — RESOLUTIONS OF THE FOURTH ASSEMBLY AND OF THE COUNCIL OF THE LEAGUE OF NATIONS, REGARDING THE HEALTH WORK OF THE LEAGUE, ADOPTED SINCE THE LAST SESSION OF THE PROVISIONAL HEALTH COMMITTEE (May-June 1923).

1. I had the honour to circulate to all the members of the Committee the report presented to the Fourth Assembly by His Excellency the Baron Adatci, as well as the resolutions adopted by the Assembly. May I recall that the Council submitted for the approval of the Assembly the scheme elaborated by the Mixed Commission for the Health Organisation of the League of Nations? The Assembly approved the scheme and requested the Council to take all necessary steps to make this agreement effective, but it also called the Council's attention to the views

expressed in the report of the Assembly's Second Committee (on Technical Organisations). The above resolution of the Assembly came, on September 20th, 1923, before the Council, who did not consider it necessary at that moment to study in detail all the suggestions of the Second Committee, as the greater part dealt with the future development of the Health Organisation. The Council decided, however, to give a decision as regards two of these recommendations.

In the first place, it resolved that the agreement between the League and the Office international d'Hygiène publique should be subject to denunciation at twelve months' notice. In the second place, it decided to request the Office international d'hygiène publique to submit the scheme adopted by the Assembly for the ratification of its Permanent Committee and to proceed to the election of the first nine members of the Health Committee of the League.

The Council resolved further to request the Secretary-General of the League to consider how the other recommendations may be acted upon in the future.

I need hardly place on record the fact that the Permanent Committee of the Office international d'Hygiène publique has ratified this scheme and accepted the condition as to its denunciation at twelve months' notice. The new Health Committee of the League was subsequently constituted, as a result of the elections held on October 27th, 1923, in Paris, and the subsequent appointment of six further members by the Council of the League of Nations on December 13th, 1923. The Permanent Committee of the Office international elected the following gentlemen, in addition to M. VELGHE, its Chairman, who sits on the Health Committee *ex officio*:

Sir George BUCHANAN, C.B., M.D., Senior Medical Officer at the British Ministry of Health.
Dr. H. CARRIÈRE, Director of the Federal Service of Health, Berne.
Dr. H. S. CUMMING, Surgeon-General, United States Public Health Service.
Dr. A. GRANVILLE, President of the "Conseil Sanitaire Maritime et Quarantenaire", Alexandria.
Professor Ricardo JORGE, Director-General of Public Health, Lisbon.
Dr. A. LUTRARIO, Director-General of the Health Administration, Rome.
Dr. F. MIMBELA, Professor at the Faculty of Medicine, Peru.
Dr. L. RAYNAUD, Inspector-General of the Health Service, Algiers.

The Council appointed the following six gentlemen:

Professor Leon BERNARD, Professor of Public Health at the University of Paris.
Professor C. CHAGAS, of the Brazil Public Health Service and Director of the Institute Oswaldo Cruz.
Dr. J. JITTA, President of the Netherlands Health Council.
Professor Th. MADSEN, Director of the State Serum Institute, Copenhagen.
Professor OTTOLENGHI, Professor of Public Health, Bologna.
Professor G. PITTALUGA, Professor at the Faculty of Medicine, Madrid.

The Council also unanimously decided to ask the Health Committee to give most favourable consideration to the names of Dr. CHODZKO and Professor NOCHT for appointment as assessors.

I may perhaps be allowed to remind the members that the constitution of the Health Organisation provides for the possibility of increasing the membership of the Committee to twenty. Indeed, the second paragraph of the second clause states:

> "The Standing Health Committee may be supplemented by the addition of not more than four public health experts as assessors; these assessors will be appointed by the Council of the League of Nations on the nomination of the Standing Health Committee and will be considered as fully effective members."

2. It may be useful to review briefly the views of the Second Committee to which the Council's attention was called by the Assembly, as well as to summarise the opinions expressed by the Council when the scheme for the Health Organisation came up for its consideration.

As regards the procedure in the appointment by the Council of the first six members of the Health Committee, the Assembly believed that the Council should consult the Chairman of the Provisional Health Committee in view of the fact that the new Health Committee was not yet in existence. As the members are aware, this consultation has taken place.

The Second Committee, having noted that the scheme did not state the terms of the appointment of the four additional members of the Committee, has recommended that they should hold office for three years just as the other members. At its December session, the Council entirely concurred with this view. It also noted that the members of the Committee are being elected by three different procedures, and it expressed the opinion that it might be convenient for purposes of reference to designate the members according to the mode of their election. In addition to the Chairman of the Permanent Committee of the Office who sits on the Health Committee by right, there are, in the first place, nine members elected by the Office, whose names do not come before the Council; the Council, in the second place, appoints six further members, while the Health Committee, once constituted, is empowered to present, for appointment by the Council, four additional names.

In this connection the Second Committee of the Assembly examined a suggestion that the members of the Health Committee should be appointed as representatives of their respective Governments and not in their individual capacity. The Assembly endorsed the desire to see the

work of the International Health Organisation of the League — even when at a preparatory stage of enquiry and investigation — carried out in the closest possible co-operation with the Governments, and considered that this co-operation would in practice be realised without difficulty. In fact, most of the members of the Health Committee elected by the Office international would sit on the Committee as experts, while attending the Office international as representatives of their own Governments. The Health Committee would certainly include a high proportion of officials from public health departments. Should all the members be Government delegates, there would be the risk that the decisions of such a Committee might be influenced by considerations other than those of a scientific or technical character.

The Assembly further considered a proposal that in the choice of members of the Health Committee, both by the Office and by the Council, due weight should be given to the importance attached by the various Governments to health questions and also to geographical representation. The Assembly felt confident that it would be enough to represent to the Health Organisation and to the Council that they would be justified in entrusting these questions to such an international body of experts as the Health Committee of the League.

After commenting upon the composition of the Health Committee, the Assembly went on to consider the functions of the Health Organisation. In this connection it fully endorsed the views expressed by the Council at its meeting of July 7th, 1923, when the scheme for the Health Organisation was adopted unamended subject to what had been said at that meeting. The Council and the Assembly in fact desired to make it quite clear that the Health Committee and the Health Section of the Secretariat would carry out their work under the direction of the Council. The Mixed Committee was congratulated by both bodies on the very definite results achieved and, in particular, on the fact that it had given the Health Committee the requisite elasticity, and had made provision—subject, of course, to the approval of the Council — for the formation of sub-committees, the calling in of experts, etc., and had also emphasised the importance of the Health Committee's work being carried out within the limits of its competence, as defined by the Council and the Assembly of the League. It was therefore clear to the Assembly that the Council would be asked for its approval of the recommendations of the Mixed Committee.

The Assembly was glad to note that the work of the Health Committee and of the Health Section will be in the future the same as it has been in the past: to give the Council advice when called upon to do so, to carry out the programme drawn up in consultation with the Advisory Council, to execute any mandate given to it by the Council or by the Assembly of the League, to take all emergency measures which may be asked for by any Member of the League, and, finally, to act, on the application of the Governments concerned, as organ of mediation and interpretation with regard to sanitary agreements.

The Assembly further considered it advisable that the agreement between the Office and the Health Services of the League, which it regards as transitional, should develop in the direction of unification. In this connection it might be useful, in the Assembly's opinion, to consider whether the Advisory Council of the Health Organisation (the Permanent Committee of the Office international) should not act in the place of conferences for the conclusion or revision of sanitary conventions. In this way appreciable economies would be effected and overlapping with international conferences avoided, although one should not lose sight of the fact that these conferences may have at times a more comprehensive constitution and more specific ends.

The Assembly has signified its approval both of the work of the Health Organisation of the League during the past year and of its plans for the future. It was anxious at the same time to emphasise that the constitution for the Health Organisation, drawn up by the Mixed Committee, was not in any respect incompatible with the resolutions of the Third Assembly, and that the Health Organisation in its new form would still be subject to supervision by the Council and the Assembly.

This anxiety also found expression in the discussions of the Council regarding the executive work of the Health Organisation. Both the Council and the Assembly have approved the scheme on the understanding that, while the Health Committee directs the health work of the League of Nations, its executive organ, the Health Section of the Secretariat, should remain under the Secretary-General's orders and be responsible to him, following, in technical matters, the guiding principles laid down for it by the Health Committee.

The Assembly also directed that the annual report which the Health Committee is to present to the Advisory Health Council should be submitted in due course to the Assembly.

Finally, a suggestion was made to the Council that it would be advisable in the future to adopt the short title of "Health Organisation" instead of "Permanent Health Organisation", and "Advisory Health Council" instead of "General Advisory Health Council". In conformity with this decision, this designation will be used throughout in the documents which I shall have the honour to submit for the consideration of the Health Committee. I need hardly add that the Assembly gave expression to the general desire not to increase the financial liabilities of the League. It was grateful to note that the scheme will not involve any increase in the expenditure of the League, particularly as there is no reason to anticipate the convening of any special sessions of the "Office" for the consideration of questions which may be submitted to it by the Council or by the Assembly. It expressed further the hope that the intimate association created by the scheme between the League and the "Office" may lead to a simplification of the work and may result in a diminution of the charges which the League has assumed in order to carry out the obligations imposed on it by Article 23 (*f*) of the Covenant.

The Assembly was assisted in its deliberations by M. Velghe, the President of the Office international, who with all his great authority explained and defended the findings of the Mixed Commission.

3. With the appointment of the first 16 members of the Health Committee of the League, the activities of the Provisional Health Committee have ceased. The Council was most anxious to thank the Provisional Committee whose work had ended, and it placed on record its gratitude in the following terms:

> "The Provisional Health Committee has rendered important services to the League and earned the gratitude of the public health administrations of all countries, including countries which are not Members of the League. The fact that several members of the Provisional Committee will be members of the new Committee is a source of general satisfaction to us, and is a guarantee that the tradition of international co-operation in matters of public health, which has already been established, will gain in strength in the future."

4. The Assembly's approval of the work and the plans of the Health Organisation has been already referred to. It endorsed unreservedly the conclusions contained in the report presented to it by the Second Committee, and in doing so it was very largely guided by the resolutions adopted by the August session of the Council, when the report on the work of the Provisional Health Committee during its sixth session was considered.

(*a*) As regards the special points noted, the Health Committee was congratulated on the results obtained in the organisation of the interchanges of public health personnel and on the very economical and judicious manner in which the special funds, placed at their disposal by the International Health Board of the Rockefeller Foundation, were being utilised.

(*b*) The current work of the Service of Epidemiological Intelligence and Public Health Statistics, as well as special studies of programmes of outstanding importance, such as mortality from cancer, the prevalence of malaria, etc., met with the full approval of the Council and the Assembly. The Assembly emphasised the desire to establish still closer relations between the national services of international organisations dealing with questions of public health. It noted with satisfaction the *liaison* effected in a simple and practical manner with the Pan-American Sanitary Bureau through the intermediary of the Surgeon-General of the United States Public Health Service and of the Director of the Public Health Service of Brazil, who act as Directors to the Bureau and at the same time serve on the Health Committee of the League. In particular, the special report which the Health Committee is to present, as a result of its enquiries in Albania, will be read with great interest.

(*c*) The Assembly and the Council expressed the wish to see the work of the standardisation of sera, serological tests, and biological products further developed. They desired to emphasise that this work would lead to researches of immediate practical usefulness and give a great impetus to international co-operation between the principal institutions of medical research throughout the world. This question was fully discussed, following a magisterial statement made to the Second Committee by Professor Madsen. In the debate which followed, the delegate of Czechoslovakia proposed, on behalf of his Health Ministry, that steps should be taken by the Council of the League to ensure immediate practical application of any agreement which might be reached as regards the standardisation of antitoxic sera under the auspices of the Health Committee. The Governments were to be invited to enforce the designation of the strength of the antitoxic sera in terms of the international units as determined by the Health Committee. The understanding regarding diphtheria antitoxin, for which units had already been adopted, could be reached without delay, while as regards the other sera measures would be taken as soon as the recommendations of the Health Committee were approved by the Council. In view of the very technical character of this proposal, the Assembly decided to refer it to the Health Organisation with the request that definite recommendations should be made to the Council.

(*d*) The request of the Netherlands Government concerning an enquiry by the Health Committee into the question of the inspection of vessels in ports, was referred to at great length by the Council. It placed on record its opinion that this is a problem which concerns very intimately the relationship of the League to the States and, while awaiting the technical advice of the Health Committee, it expressed its satisfaction that the machinery of the League will be used for the study of such problems and may prove of value in furthering co-operation between the health services of different countries and the application of quarantine measures and sanitary examination at all the important ports of the world. This subject was discussed fully by the Second Committee of the Assembly, which approved the decision of the Council to authorise the Health Committee to examine the Dutch proposal. The desire was expressed by the Third Assembly that the Health Committee should consult, if necessary, the other technical organisations of the League and submit to the Council the result of such deliberations. This additional recommendation applies to both the Czechoslovak and the Dutch proposals.

(*e*) The Council and the Assembly examined in detail the report of the Health Committee as regards both the past and the present activities of the Epidemic Commission. They formally noted that those activities proved remarkably successful and effective. The Assembly also passed a resolution concerning the finances of the Epidemic Commission, to which I shall have the honour to refer at some length in the appropriate chapter of my report.

Finally, the Assembly examined a proposal of the Second Committee that the reports presented to the Permanent Mandates Commission by the Mandatory Powers should be communicated to the Health Committee of the League for any comments which it might desire to make after studying the chapters of the report dealing with questions of public health. The Assembly,

being desirous of seeing intimate relations established between the special Technical Organisations of the League, adopted the following resolution:

> "The Assembly is of the opinion that it would be desirable for all health reports presented to the Permanent Mandates Commission to be communicated to the Health Committee of the League of Nations for any recommendations it may desire to make to the Permanent Mandates Commission."

Although the terms of this resolution did not call for any decision of the Council, the Council resolved, in accordance with precedents in similar cases, to place on record its unanimous desire to secure the execution of the wish of the Assembly. According to Article 22 of the Covenant, the Permanent Mandates Commission is constituted "to receive and examine the annual report of the Mandatories, and to advise the Council on all matters relating to the observance of the Mandates". The Council did not wish to add anything to the principle laid down by the Assembly, but it pointed out that it might clearly be of advantage that the body immediately responsible for advising the Council on Mandates should in a special field, such as that of public health, be conversant with the relevant conclusions of the Organ of the League particularly qualified to deal with health matters. The Council had no doubt that the Mandates Commission would receive with gratitude, and consider with due care, any recommendations which the Health Committee would wish to communicate to it. I have been instructed to take the necessary steps to secure the execution of this decision taken at the session of the Council held in December 1923.

B. — THE GENERAL ACTIVITIES OF THE HEALTH ORGANISATION FROM JUNE 1923 TO JANUARY 1924.

The Health Organisation continued to develop the work in accordance with the policy laid down by the Provisional Health Committee during their six sessions, and approved by the Council of the League. It may be convenient to recall the two all-important limitations necessarily imposed on the work of any international health organisation, namely, first, that no activity can be undertaken which falls properly within the province of national health administrations, and, second. that no questions of merely academic interest can be taken up for special study, as it is essential that any enquiry or work started under the auspices of the Health Organisation be carried to its logical conclusion. The activities of the Organisation confined within these limits may perhaps be classified under three heads:

(1) The activities regarding the control of epidemic disease.

(2) The activities regarding epidemiological intelligence, public health statistics and special international problems of epidemiology and public health.

(3) The activities of the Organisation as a link between the national health administrations, and as a means of co-ordinating international medical research on public health problems.

With reference to its main duties as approved, on the recommendation of the Provisional Health Committee, by the successive Assemblies, it will be found that the Health Organisation has endeavoured to develop every aspect of the work with which it has been charged. The various heads of this work are here reproduced for convenience:

(*a*) To advise the League of Nations in matters affecting health.

(*b*) To bring administrative health authorities in different countries into closer relationship with each other.

(*c*) To organise means of more rapid interchange of information on matters where immediate precautions against disease may be required (*e. g.* epidemics), and to simplify methods for acting rapidly on such information where it affects more than one country.

(*d*) To promote the conclusion of international agreements necessary for administrative action in matters of health, and their revision when circumstances require, and to collect information as to action taken to give effect to such agreements.

(*e*) In regard to measures for the protection of the worker against sickness, disease and injury arising out of his employment, which falls within the province of the International Labour Organisation, the Health Organisation will co-operate with and assist the International Labour Organisation, it being understood that the International Labour Organisation will, on its side, act in consultation with the Health Organisation in regard to all health matters.

(*f*) To confer and co-operate with International Red Cross Societies and other similar societies under the provisions of Article 25 of the Covenant.

(*g*) To advise, when requested, other voluntary organisations in health matters of international concern.

(*h*) To organise missions in connection with matters of health with the concurrence of the countries affected.

It is the duty of the Health Committee of the League to ensure the execution of the above duties in close co-operation with the Permanent Committee of the Office international d'Hygiène publique. In particular, questions relating to paragraph (*d*) are to be referred to that Committee for its opinion.

1. The Activities of the Health Organisation regarding the Control of Epidemic Diseases.

(*a*) When the work of the Epidemic Commission of the League was started in April 1920, the prevalence of typhus, relapsing fever and cholera over a very large area of Eastern Europe was the chief concern of all those responsible for the protection of public health in their respective countries. The return to normal conditions coincided with the fall of the incidence of typhus and relapsing fever to almost pre-war level. Since 1922 no noteworthy outbreak of cholera has been recorded in Europe, and although it is difficult to foretell whether or not the epidemic wave of cholera in the territories of the Ukraine and Russia will show any alteration from last year's course, it is clear that none of the three diseases represents at the moment a danger from the international point of view. Enteric fever and tuberculosis are certainly much more prevalent in Eastern Europe, and tuberculosis also in Central Europe, than they were before the war, but they are not diseases of any unusual occurrence.

The characteristic feature of the present epidemic situation, as it developed in the summer of 1923, is the very widespread prevalence of malaria in the territories of the Soviet Republics, in Bulgaria, the Kingdom of the Serbs, Croats and Slovenes, Albania and Greece. Malaria continues to be a problem of great gravity for Italy, Spain, Portugal and Poland.

The potential danger of the spread of any one of the chief epidemic diseases was closely connected with the mass movements of populations. These seem to have come to an end, with the exception of these connected with the exchange of populations between Greece and Turkey as a result of the Treaty of Lausanne.

The only active work on which the Epidemic Commission was engaged when the Provisional Health Committee was last in session was being carried out in Greece. This has now come to an end, owing both to the lack of funds and to the return of conditions to a more normal state. Dr. Gauthier brought his campaign of vaccination, carried out on behalf of the Hellenic Ministry of Public Health, to a successful conclusion by the end of September 1923. He had an opportunity of observing and recording the results of the intestinal vaccination against dysentery. The details will be found in the very interesting report which I had the honour to circulate to all the Members.

The work of the Epidemic Commission in Poland has also terminated, and the Chief Commissioner is at present engaged in liquidating the office in Warsaw.

Our representative in Russia returned to Geneva at the beginning of October. Throughout the whole of the year 1923 we were endeavouring to assist the Soviet Sanitary Authorities and, in particular, the special Vaccination Committee which was set up in Moscow in order to test the value of intestinal vaccination against cholera, dysentery and typhoid. We have continued our assistance in the organisation of sanitary courses for medical officers of health in Moscow, Kharkoff and Warsaw.

The Chief Epidemic Commissioner, in the report which will be found annexed, refers in fuller detail to all these activities. I am glad to be able to state that the continuation of the essential technical work of the Epidemic Commission, in the carrying out of epidemiological enquiries and the placing of the technical knowledge of its representatives at the disposal of Governments, will be rendered possible by the vote of the Assembly of a credit of 50,000 francs.

The relief operations of the Commission have been always supported by special grants voted by the Parliaments of the several contributing States. No special appropriations for this purpose are provided for in the general budget of the League. The Provisional Health Committee at its last session having requested the Council to consider the possibility of providing a special emergency fund for the purpose, the Council brought the question to the attention of the Assembly. The Assembly was not willing to increase the budget of the League, which contains a special item for unforeseen contingencies to be drawn upon at the discretion of the Council. This credit may, however, be utilised, only for political purposes, and in recommending that in case of need the Council should study what resources could be placed at the disposal of the Health Organisation to enable it to intervene immediately, through the intermediary of its Epidemic Commissioners, in the event of a sudden epidemic outbreak of exceptional importance, which might involve political consequences, it was evidently the intention of the Assembly to authorise the Council to have recourse to the special appropriation. Thus funds may be conceivably provided from the general budget of the League in very exceptional circumstances.

As the epidemic danger in Eastern Europe began to subside, the Epidemic Commissioners were free to devote more and more time to purely technical work. One of them (Dr. W. E. Haigh), at the request of the Malaria Sub-Committee of the Provisional Health Committee, enquired into the prevalence of malaria in Albania, while the Chief Epidemic Commissioner was sent on a mission to the Far East and has presented a full report, which calls for the special examination of the Committee. The Commissioners are thus at present engaged in carrying out those parts of the normal work of the Health Section of the Secretariat for which they are more particularly qualified by the special knowledge they have acquired.

(*b*) The normal functions of the Health Organisation in epidemic control are obviously those of enquiry and advice, and work was continued in these directions throughout the year.

Thus, the Provisional Health Committee, being fully alive at its last session to the importance presented by the prevalence of malaria, has set up a Sub-Committee which was entrusted with the task of examining the information collected with regard to the epidemiological malaria situation throughout the world, and particularly in Europe, and the different prophylactic methods used, or which might be used, to combat this disease, and, lastly, of preparing the replies to questions regarding these problems which might be asked by the health administrations of the different States.

The Sub-Committee is composed of Dr. Lutrario (Chairman), Sir George Buchanan and Professor Leon Bernard. Three experts were co-opted by the Sub-Committee, namely, Colonel J. F. James of the British Ministry of Health, Professor Marchoux of the Pasteur Institute, and Dr. Labranca of the Italian Sanitary Administration. Professor Swellengrebel (Netherlands) and Dr. Hansen (Denmark) were requested subsequently to prepare reports for the consideration of the Committee.

Dr. Lutrario is reporting fully to the Committee on the mandate entrusted to him in June last.

I have already referred to the fact that Dr. Haigh of the Epidemic Commission, at the request of the Sub-Committee, was instructed to undertake a preliminary enquiry into the prevalence of malaria in Albania, and has presented the result of his survey to the members of the Sub-Committee. The Albanian Government has since applied for the appointment of a technical adviser on health matters, who would be entrusted with the direction of any anti-malaria measures which it might be practicable to undertake in Albania at the present time.

On the other hand, the Hellenic Ministry of Public Health has addressed a request for the despatch into Greece of a special medical commission to enquire into the prevalence of malaria and to advise on the measures to be taken by the Greek authorities. The Hellenic health administration is also anxious to obtain assistance as regards the supply of quinine.

As regards the main centre of the prevalence of malaria in Europe, namely, the Soviet Republics, the Chief Epidemic Commissioner will be able to place before the Committee information obtained at the session of the Pan-Russian Congress on Malaria held last month in Moscow. This session he attended on behalf of the Health Organisation of the Secretariat.

I am hoping to obtain information on the very energetic measures taken by the Health Services of the Kingdom of the Serbs, Croats and Slovenes, which have been engaged in a scientific campaign against malaria during the last two years.

While active work in the control of malaria is carried out by the various Health Services in Europe, field experiments on a large scale are being continued in the United States and in Northern Brazil under the auspices of the International Health Board of the Rockefeller Foundation and of the United States Federal Public Health Service. Dr. Chagas will, I hope, present at a subsequent session of the Committee a report on his own work in Brazil. The Public Health Service of the Republic of Argentine has invited Professor Muehlens of Hamburg to enquire into the Malaria situation of the northern parts of the Republic. Professor Muehlens was entrusted by the Government of Belgrade with the task of directing the anti-malaria work in Dalmatia, and he hopes on his return from the Argentine to visit several other Latin-American countries. His observations and conclusions will be available for the members of the Health Committee, subject to the consent of the Governments on whose invitation Professor Muehlens went to South America.

Without referring to the work which is carried out in Asia and in Africa, it is clear that a very active investigation and experimentation is being undertaken at the present moment in various countries. It is highly desirable for all the services concerned in this campaign to be able to benefit by the experience of the other workers in this field of public health activity. The Health Organisation of the League may undoubtedly render a great service in systematising enquiries and in provoking joint investigation for the elucidation of special problems in the epidemiology of malaria. The results of these enquiries would form a basis for definite advice to those administrations which are applying for counsel to the Health Committee.

I believe that the International Health Board of the Rockefeller Foundation is deeply interested in the problem of malaria, and co-operation might be established at a later date with the work of the Health Organisation of the League.

The Provisional Health Committee did not limit its enquiries into the prevalence of epidemic diseases to European countries. At the fourth and fifth sessions in 1922 and 1923 it discussed

the advisability of instituting an investigation into the prevalence of tuberculosis and sleeping-sickness in Equatorial Africa. It has appointed an Expert Committee, and was fortunate enough to secure the services of Dr. Andrew Balfour (Chairman), Dr. E. Van Campenhout, Professor Gustave Martin and Dr. A. G. Bagshawe, who formed the Expert Committee appointed by the Health Committee, League of Nations, in 1922. This Expert Committee has prepared a most valuable and very detailed report, which I had the honour to circulate to all the members. This is but an interim report, bringing information as far as possible up to date, and it is intended to submit a second interim report which will include intelligence concerning those countries which are now omitted. Thereafter it is hoped that a final report will be submitted containing the Expert Committee's views and recommendations, both as regards tuberculosis and sleeping-sickness. The Expert Committee drew attention in the body of its report to the possibility of international co-operation in the eradication of sleeping-sickness in certain territories (*e.g.* such as the Sudan); and the study of its report allows us to anticipate that it will suggest that the Health Committee should recommend to Governments the conclusion of special arrangements concerning the compaign against sleeping-sickness on both sides of the frontiers of neighbouring territories on their African possessions. It is hoped that specific proposals of the Expert Committee will be formulated in time for their consideration at the following session of the Health Committee.

While the Mission despatched to the Far East has as its primary object the collection of information regarding the incidence of epidemic diseases, especially those of international importance, in important ports, and the measures taken to prevent the transmission of these diseases to other ports, yet the Chief Commissioner during his mission was able to enquire into the prevalence of plague, cholera and smallpox in the most important territories in the Far East, and has thus extended the field of the enquiries of the Health Organisation also to Asiatic countries.

2. The Activities regarding Epidemiological Intelligence, Public Health Statistics and Special International Problems of Epidemiology and Public Health.

In accordance with the policy laid down by the Provisional Health Committee at its First Session, the Service of Epidemiological Intelligence and Public Health Statistics has formed a regular part of the activities of the Health Section of the Secretariat since its inception. The work has very considerably developed owing to the grant of the International Health Board of the Rockefeller Foundation, and the first twelve months of the period of five years for which this grant was made available have now elapsed. While, during the first year of our work, particular attention had to be paid to information regarding the prevalence of epidemic diseases in Eastern Europe, the second year of the activities was devoted to a great extent to securing a regular supply of returns on infectious diseases as issued officially by the public health administrations of most countries of the world. This task is now almost completed, but further arrangements will have to be made to secure the published intelligence from the more remote countries.

The data thus obtained were published in the "*Monthly Epidemiological Report*", of which seven numbers have appeared since July 1st, 1923. The issuing of these reports has facilitated in many instances the obtaining of further data, in view of the anxiety shown by several sanitary administrations to see their own national returns published not later than the statistics of other countries. In one very notable instance it was possible to secure the regular service of a monthly statement of the prevalence of notifiable diseases from a country which had not hitherto been in the habit of issuing such statistics at regular intervals.

All these statistics represent but crude material, and it became obvious at once, as indeed it was recommended by the successive sessions of the Provisional Health Committee, that detailed information would have to be sought as regards the procedure followed by the several countries in the collection of their epidemiological returns as well as regards the organisation of their public health Services. In the report presented to the Provisional Health Committee in May 1923, I referred to the request addressed by me to the Chiefs of the public health services of most European countries for their co-operation in securing a series of authoritative surveys of the public health legislation and administration, as well as the practice used in regard to the collection of vital and public health statistics in their several countries. Mr. Sydenstricker, the Chief of the Service of Epidemiological Intelligence and Public Health Statistics of the Health Section, in his annexed report, refers in detail to the "Sanitary Survey" reports which have been received to date. I have the honour to circulate to the members the first two of those reports, which I am sure will make in time a most valuable collection of volumes.

At the same time steps were taken for the preparation for different countries of handbooks relating to the origin and nature of their vital statistics, including the different national requirements as regards notification of infectious disease and the results of the system from the point of view of completeness. I beg to refer again for details to Mr. Sydenstricker's report, and I should like to point out that all the different publications and the special enquiries are but single steps in the study of the returns from the point of view of uniformity and comparability. It is obviously the fundamental duty of the Health Organisation of the League, particularly after

it has been constituted in its definite form, to organise means of more rapid interchange of information on matters where immediate precautions against disease may be required (*e.g.* epidemics), and to simplify methods for acting rapidly on such information where it affects more than one country. A good deal of ground must be covered still before practical recommendations can be made. All this work should be carried out step by step in the closest *liaison* with the technicians of the various national health administrations. With this object in view, special conferences and consultations are taking place for the thorough study of partial problems and, as soon as the advisers are ready to make a technical proposal to the Health Committee, their reports will be submitted for the consultation of the Committee which may desire to frame definite recommendations of policy to the Council. With the same object in view, steps were taken to secure the regular collaboration of medical officers in several countries.

The various publications referred to are still on their trial. In addition to the "Monthly Epidemiological Reports", the publishing of "Epidemiological Intelligence" was continued, it being intended to include under this heading either special reports or compilations of figures for a longer period, as, for example, for six or twelve months. The issuing of "Epidemiological Intelligence, No. 7", containing a general review of the prevalence of notifiable diseases in Europe in the year 1922, was sanctioned by the last session of the Provisional Health Committee. It is hoped that it will be possible to circulate to the members of the Committee at a much earlier date a somewhat similar compilation for the year 1923.

All the publications contain a great lacuna, in so far as the intelligence of the prevalence of the chief epidemic diseases in the Far East is concerned. The report of the Chief Epidemic Commissioner makes it clear that no improvement may be expected until a special bureau is set up at some convenient central port in the Far East. I need not refer in detail to this proposal, which will be discussed together with the other recommendations of the Far Eastern Mission, but I should like to point out that I believe the Health Committee may rely on the assistance of the International Health Board of the Rockefeller Foundation should it decide to promote the establishment of such a subsidiary centre of information.

While the Health Section of the Secretariat was attempting systematically to secure official data, to collect information and to obtain qualified technical advice with a view to the better study of the problem, it has also taken steps to establish personal contact with the public health officials who are responsible in their several national administrations for epidemiological intelligence or vital statistics. A first collective study was organised on an experimental basis from October until December 1923, and the experience gained, which is described in detail in Mr. Sydenstricker's memorandum, justified the belief that the studies will prove a proper means for bringing medical statisticians into closer relations with each other and with the intelligence service of the Health Organisation of the Secretariat, as well as for affording means by which various important differences between countries in the basis of their vital statistics, and in the records of epidemics, may be studied with a view to securing greater uniformity. I need hardly remind the Committee that the organisation of the studies was rendered possible by the grant of the International Health Board of the Rockefeller Foundation, the acceptance of which the Committee recommended to the Council at its June session. The grant is available for another year, and it will enable the Health Committee to elaborate a definite scheme for securing this *liaison* by changing the composition and the programme of the successive collective studies I beg to recall that this method was adopted for the interchange of public health personnel and was crowned with success. It might be advisable, for instance, to limit the period of the collective studies to six weeks and the number of participants to five, taking them by groups of neighbouring countries. I should like to emphasise that the medical and vital statisticians are enabled by this system to work with the members of the Health organisation in the preparation of technical proposals for the decision of the Health Committee, while at the same time imparting to the members of the staff their national experience.

Mr. Sydenstricker, who, as chief of the competent service of the Health Section of the Secretariat, is responsible for the valuable development of the activities of the service, must return temporarily to his post with the United States Public Health Service. I very much hope that he will obtain a further and more extended leave of absence from his administration, allowing him to resume his work with the Section from the end of August 1924.

The Health Organisation of the League, in undertaking an enquiry into the notable differences which exist in the mortality from certain forms of cancer in different countries, especially England, and Wales, Italy and the Netherlands, will be able to advance considerably the study of the uniformity and comparability of vital and medical statistics, particularly as the problem chosen represents a very difficult test case. A special Sub-Committee on cancer was appointed to consider this question, consisting of Sir George Buchanan, Chairman, Dr. Lutrario and Dr. Jitta. The following experts were co-opted: Dr. H. D. Deelman (Netherlands), Professor Giuseppe Giardina (Italian Health Administration), Professor Ernesto Pestalozza (Italy), Dr. Major Greenwood (British Ministry of Health), Dr. H. Pottevin (Deputy-Director of the Office international d'Hygiène publique), while Professor Alfredo Niceforo (Professor of Statistics in the University of Naples), Dr. J. Lane-Claypon (of the British Ministry of Health) and Dr. Methorst (Netherlands) participated in the work of the Sub-Committee. It is the duty of the Sub-Committee

to take note of the communications recently made to the Office international d'Hygiène publique on the subject of the differences existing in the mortality from cancer of the female breast and the genital organs in England, Italy and the Netherlands, to consider the means most suitable for the determination of the cause of these differences, and to present at a later session of the full Committee a plan of practical work for this purpose if, in its opinion, such work would be likely to produce useful results in the elucidation of the cancer problem. I had the honour of circulating the reports of the Second Session of the Sub-Committee on Cancer, and a further detailed report will be presented to the Committee by Sir George Buchanan.

The Health Section of the Secretariat was instructed by the last session of the Provisional Health Committee to collect such information as existed regarding the spread of rhinoscleroma. I have accordingly, in consultation with Professor Schrœtter of Vienna, whose proposal was discussed at the session referred to, circulated a request to the chiefs of public health administrations for data concerning the prevalence of the disease. The replies so far received are too incomplete to allow of a report being made. This will be presented as soon as more complete information is received.

The Health Organisation is called upon from time to time to undertake enquiries and to secure information not only on the prevalence of disease, but also on specially important problems of public health in their international bearing. Thus the Advisory Committee on the Traffic in Opium have requested the Health Committee to make enquiries with a view to determining the legitimate consumption of opium in the various countries of the world. A special Sub-Committee was appointed for the purpose, which undertook the work in conjunction with a similar Sub-Committee of the Advisory Commission on Opium. The members of the Sub-Committees have formed a special Mixed Committee, which met several times under the chairmanship of Dr. Carrière, who acts also as Chairman of the Health Organisation Sub-Committee on the same subject. Dr. Chodzko is the second member of the Sub-Committee, while Dr. Campbell and Dr. Anselmino represent the Advisory Opium Committee. Professor Knaffl-Lenz of the Vienna University, who served on the Health Section of the Secretariat for six months, has been co-opted as member of the Mixed Sub-Committee and is acting in an expert capacity.

Dr. Carrière is presenting to the Committee a full report on the very remarkable conclusions which they have reached as a result of the enquiries undertaken during the last twelve months, while Professor Knaffl-Lenz will also submit a memorandum.

The recommendations which the Committee may decide to frame on the basis of the reports and proposals regarding the legitimate consumption of opium, will form, in all likelihood, the basis for a discussion at the two international conferences which are being convened in the course of 1924, in order to consider the world production of opium and to discuss the methods for the limitation of the consumption. The proposals of the Committee will undoubtedly be awaited with very great interest by the Advisory Opium Committee as well as by the Council and the Assembly of the League.

3. The Activities of the Health Organisation as a Link between National Health Administrations, and as a Means of co-ordinating International Medical Research on Practical Problems of Public Health.

A. — *Sanitary Conventions.*

(*a*) I had occasion to refer in my previous reports to the Sanitary Conventions which have been concluded between different States in Central and Eastern Europe and to the fact that the majority of those Conventions contained a clause by which the Health Committee of the League was recognised as an organ of mediation in the case of eventual disputes in the interpretation of the Conventions. The Provisional Health Committee has obtained the Council's approval for a detailed procedure of mediation which it elaborated at its fourth session. No case of dispute came before the Committee.

According to the information received, the Sanitary Conventions between Russia and Poland, and Czechoslovakia and Poland, have been finally ratified and the documents of ratification duly exchanged. The Convention between the Kingdom of the Serbs, Croats and Slovenes and Bulgaria, the draft of which was circulated at the last session of the Provisional Health Committee, has not yet received final ratification.

While the conclusion of these various agreements has undoubtedly brought into closer relationship the various Health Services in that part of Europe, none of these instruments seems to have so far been put to practical test.

(*b*) The Model Convention on Sanitary Control of Traffic on Waterways, adopted at the June session of the Provisional Health Committee, was submitted to the Mixed Committee consisting of the Waterways Sub-Committee of the Health Organisation and a Sub-Committee of the Transit Organisation of the League. The Waterways Sub-Committee, of which Dr. Chodzko is the Chairman, and Dr. Lutrario (who acts as Rapporteur) and Dr. Carrière are the other two members, was set up at the fourth session of the Provisional Committee. The question was considered for

the first time at the European Health Conference at Warsaw in 1922, and its general resolutions were afterwards approved by the International Conference at Genoa. The Provisional Health Committee subsequently laid down the main principles to be followed in the drafting of this Convention, and instructed its Sub-Committee to prepare this draft in collaboration with the League Committee on Communications and Transit. Two sessions of the mixed body took place in 1923. At the second meeting, held at the beginning of September, the Model Convention adopted by the Health Committee was modified and shortened. Dr. Lutrario was unfortunately unable to attend the September session, and in a report which he is presenting to the Health Committee he will expound his views on the modified scheme.

(*c*) While the work of the Waterways Sub-Committee resulted in a model agreement in no way affecting the obligations arising out of international health conventions, another draft is submitted to this session of the Health Committee which is closely related to the International Sanitary Convention. Dr. Norman White included in his report definite proposals regarding an arrangement to be concluded between the Health Administrations in the Far East, and this Convention would obviously be of considerable importance to all the States of the world. The study of this convention will be greatly facilitated by the constitutional links established between the Health Committee and its Advisory Council, the Comité Permanent of the Office International. The Committee may be assisted in its deliberations by the proceedings of the Congress of the Far Eastern Association of Tropical Medicine, at which the draft of a similar convention was considered very carefully and definite resolutions were adopted in which a reference is made to the previous work both of the Health Committee of the League and the Office International.

(*d*) The Provisional Health Committee considered at its last session a proposal made to it by the Dutch Government to examine the question of "libre pratique" of ships. In Holland, the Government is authorised to exempt vessels coming from one port from any health formalities before entering another port, provided all necessary measures of disinfection, deratisation, etc., had been taken at the first port. The Dutch Government thought that, from an international point of view, it would be highly desirable to extend the scope of this measure in the interests of commerce. They were faced, however, by the difficulty of admitting to free circulation a vessel coming from a foreign port unless absolute reliance coned be placed on the manner in which the vessel was dealt with at that port. The Dutch Government could not at present ascertain whether they would be justified in exempting the vessels from health formalities in Dutch ports, and they thought that, in view of the general interest of the question, the competent technical organisation of the League should enquire into the problem. The enquiry might, in their view, result in a list of foreign ports being drawn up which were sufficiently well equipped to justify the admission of vessels from those ports to free circulation. Obviously, nothing untoward should have taken place on board during the voyage from one port to another, the Dutch Government merely wishing that a vessel sailing from an infected port should, if it had been admitted to free circulation at a port of call, be permitted to enter a third port without health inspection, unless any suspected case of disease had occurred during the last portion of the voyage.

This important proposal was referred for examination to a special Sub-Committee, consisting of Dr. Cumming (Chairman), Sir George Buchanan, Dr. Chagas and Dr. Lutrario. I have already mentioned that both the Council and the Assembly have discussed at some length this question, which has been referred to in a special resolution of the Assembly. The special Sub-Committee not having as yet reached an agreement as to the proposals to be presented to the Committee, the question again comes before the Committee for consideration.

B.— *Investigations on the Standardisation of Sera, Serological Tests and Biological Products.*

(*a*) The Provisional Health Committee at the very outset of its activities adopted the proposal of Professor Th. Madsen regarding the initiating of joint investigations by the principal medical research institutions of the world with a view to obtaining an agreement on the standards of potency of antitoxic sera. Professor Madsen accepted the mandate given him by the Committee to act as a Director of Research and he has very kindly placed at the disposal of the Committee his own Institute in Copenhagen, which has been acting throughout, and continues to act, for the purpose of these investigations, as the central laboratory of the Health Organisation of the League.

The League Organisation would not be competent either to initiate or to finance purely scientific medical research. The Provisional Committee has recognised, however, that it is the duty of an international health organisation to take the lead in bringing about joint laboratory investigations of problems which are ripe for practical solution and which, but for such initiative, might remain unsolved. Such an intervention is particularly important in cases where legislative, and administrative measures must be based on the outcome of experimental investigations.

As the members of the Committee are aware, two international conferences of representatives of the competent medical research institutes were organised by the Provisional Health Committee. Professor Madsen, as Director of Research, was in the Chair both in London in December 1921 and in Paris in November 1922. The London Conference drew up a general programme of laboratory investigations to be conducted by the participating institutes with regard to the standardisation of

the anti-diphtheritic, anti-dysenteric, anti-pneumococcic and anti-tetanic sera. It was also decided to enquire into the possibility of standardising certain newer precipitation tests introduced in the sero-diagnosis of syphilis.

Investigations based on the plan drawn up in December 1921 were continued throughout 1922, so that progress reports on every one of the problems under examination could be presented during the Second International Conference held in November of that year in Paris. In the meantime, in September 1922, a special meeting was convened in Geneva to consider the agreement already reached as regards the international unit of diphtheria anti-toxin.

The Paris Conference marked a second stage in the development of the joint investigations. The main research on diphtheria anti-toxin having come to an end, provision was made enabling the competent institutions of all countries to apply regularly to the Institute in Copenhagen for the re-testing of their diphtheria standards gauged in accordance with the accepted international unit. In accordance with this provision the Copenhagen Institute has tested the American unit, at the request of the Hygiene Laboratory in Washington, D.C., as well as the German unit, which was sent for examination by the Institute of Experimental Pathology at Frankfort. The two units were found to be identical. Lastly, the National Institute for Medical Research, which is now making arrangements, on behalf of the Imperial Medical Research Council, for British standard units for the several sera, has also submitted for examination its diphtheria standard. This was found to be identical with the above-mentioned units.

As regards the remaining investigations, having compared notes on the work already performed, the participating scientists agreed on a detailed technique to be followed for the examination of the remaining problems. Final agreement concerning the tetanus anti-toxin is within sight, while investigations on dysentery and pneumococcus sera are still proceeding.

During the year 1923 very active research was carried on into the sero-diagnosis of syphilis. Early in the year, a technical assistant from the Central Laboratory of the Health Committee (State Serum Institute in Copenhagen) visited all the institutes taking part in this investigation in Europe, placing at their disposal the experience obtained in Copenhagen where, simultaneously, similar experimentation was being undertaken. This gave a new impetus to the work and by the end of the summer it became evident that it would be possible to bring together representatives of these institutes in the hope of reaching an agreement. Accordingly, at the beginning of November, a very novel type of international conference was held in Copenhagen. For a period of fifteen days the directors of several institutes, accompanied by their technical assistants, engaged from morning until late at night in laboratory work, examining side by side the rich material placed at their disposal by Professor Madsen. The important results obtained are summarised in a special report which has been circulated to all the members.

I may perhaps be allowed to refer here to the very remarkable nature of this gathering. It is obvious that understanding amongst research workers can be obtained more easily in a laboratory than round a table, and this first experiment may have established a precedent which will be followed in the future.

Professor Madsen, in a report which I hope to circulate before the end of the month, will place before the Committee the results which have already been achieved.

(*b*) Encouraged by the fruitful results of the work on standardisation, the Provisional Health Committee recommended to the Council at its last session the extension of these investigations into the domain of biological products. The procedure adopted for the serological conferences was followed again. Advantage was taken of the meeting in July 1923 of an International Congress of Physiology at Edinburgh, at which the leading physiologists and pharmacologists of various countries were present, for the convocation of a technical conference of those among them who specialised in the standardisation of biological products. This conference drew up a plan of laboratory work, while the co-ordination of the investigations was entrusted to Professor H. H. Dale, of the National Medical Research Institute of London, who agreed to act as a Director of Biological Research, just as Professor Madsen is acting as Director of Serological Research. A memorandum of the results of the conference was circulated to all the members of the Committee and Professor Dale is submitting a progress report for the information of the Committee.

In view of the very technical nature of the question involved, and the very great practical importance of the results obtained, the Provisional Committee decided at its last session to authorise its Chairman to appoint a Committee of Experts to collaborate with him in the direction of the general work undertaken with regard to the standardisation of sera, of serological tests and of biological products. This Permanent Standards Committee, under the Chairmanship of Professor Madsen, is composed of Dr. McCoy, the Director of the Hygienic Laboratory at Washington; Dr. Calmette, Deputy-Director of the Pasteur Institute in Paris; Professor H. H. Dale, Director of the National Research Institute in London; and Professor Nocht, Director of the Institute of Tropical and Experimental Medicine, Hamburg, while your Medical Director will act as its secretary. It is hoped that it will be possible to convene a meeting of this Committee in May neet.

(*c*) The Chief of the Section of Industrial Hygiene of the International Labour Office will bring before the Committee a proposal, emanating from his Consultative Commission of Industrial Hygiene, as to the desirability of instituting international joint investigations into the efficacy of the procedures of disinfection in regard to anthrax. I am circulating his report, and it will be noted that the formation of a mixed sub-committee is suggested, on which both the Health Committee and the Consultative Commission would be represented. This mixed body may

perhaps desire, by appointing a Director of Laboratory Research, to follow the precedent set in the standardisation of serological investigations. This enquiry would differ, however, in so far as practical experiments would have to be carried out in the various factories, and it is suggested that this part of the investigation should be in the hands of National Committees.

(*d*) The Committee, while discussing the comprehensive suggestions made in the report of the Far Eastern Mission, may wish to consider the advisability of having an enquiry made into some of the problems affecting international health, in accordance with the practice tested in connection with standardisation. Thus, for instance, the fumigation of ships in freight or the construction of rat-free stores, and the study of the problem of eliminating the rat from stores and ships, may be suited for enquiry on the above lines. There seems little doubt that the problem of the species of rats and species of rat fleas in ports and in ships in the Far Eastern area might, in the hands of a competent body of experts in the Far East, become the subject of a joint enquiry carried out on the lines of a team research similar to the other experimental investigations initiated by the Health Committee of the League.

C. — *Interchange of Public Health Personnel.*

1. The members of the Committee will remember that a system of Interchange of Public Health Personnel was initiated in October 1922, being made possible by a grant from the International Health Board of the Rockefeller Foundation. The Board has agreed to provide a sum of $60,080 for the purpose during a period of three years terminating in October 1925, a credit of 50,000 Swiss francs being allotted to the same purpose in the general budget of the League. During the first fifteen months of the operation of this system, experience was gained as to the best method to be applied in its organisation. As a result of very full discussion at the last session of the Provisional Committee a programme was drawn up for the year 1924 which provided for:

(*a*) Collective general interchanges of Medical Health Officers responsible for general public health activities:
First interchange, from February 1st to April 12th in Great Britain.
Second interchange, from April 24th to July 14th in the Netherlands and Denmark.
Third interchange, from August 10th to September 20th in Switzerland.

(*b*) Collective general interchanges of Specialists:
(i) Interchange of Medical Health Officers engaged in anti-tuberculosis health work, from February 6th to April 30th.
(ii) Interchange of School Health Officers.

(*c*) Individual Missions.

2. The most recent of the general interchanges was completed at the beginning of January 1924. This, the third general interchange, was held in the United States of America, as a result of the cordial invitation of Surgeon-General Cumming, of the United States Public Health Service, and was an unqualified success.

The participants, who were accompanied throughout by a representative of the Health Section, numbered 24 and were drawn from 18 different countries, as follows: Belgium (2), Brazil, Canada, Chile (2), England (2), France (2), Germany, Greece, the Netherlands, Italy, Mexico, Norway, Poland, Russia (3) one of whom was a sanitary engineer), Salvador, Kingdom of the Serbs, Croats and Slovenes, Spain and Switzerland. It will be noted that in this group, visiting a country not itself in the League, there were representatives not only of countries which are Members, but of three (Germany, Mexico, and Russia) which are not Members of the League. The members were for the most part experienced medical officers of health and took an eager and sustained interest in all that was proffered them in a most comprehensive and illuminating programme.

The European party arrived in New York harbour on September 6th, where they were greeted by Dr. Grubbs, commanding the Quarantine Station, in the name of the United States Public Health Service, and in Washington, D.C., on September 9th, where they were joined by the members from North, Central and South America.

The general plan envisaged a preliminary two weeks in Washington, with the Public Health Services; a month spent in Southern States to study the activities of State Health Administrations, more particularly in the wide rural areas; a month in the more industrialised Northern States, studying municipal methods in greater detail; and a final period in New York port, whereafter members were granted a "free" period of ten to fifteen days to study their own particular subjects in greater detail. The majority of the European members spent altogether 97 days on American soil.

The interchange commenced in the offices of the United States Public Health Service in Washington, D.C., on September 10th, 1923, with an address of welcome by Surgeon-General Cumming, followed in the afternoon by an informal reception. The party was introduced to the members of the staff in Washington, and was enabled to discuss with them their various activities.

During the next two weeks the days were fully occupied with addresses and visits to points of interest in the vicinity. The earlier addresses were designed to explain the development, organisation and activities of the Federal Health Service and its relations with State Health

Services, and were given by Dr. Kerr, Dr. Lloyd and Dr. Warren. Copies of all these addresses were distributed afterwards to the members of the party, for permanent reference. A series of addresses on the work of the different divisions was next given by the Assistant Surgeon-General in charge of each division, and revealed the widespread activities in which the Federal Service participates. In this phase Dr. Long explained the foreign quarantine system and Dr. Draper the interstate quarantine methods; Dr. Smith spoke of public relief activities and Dr. White of the social hygiene work; Dr. Frost discussed his work on stream pollution and Dr. Stimson outlined the many questions receiving the attention of the research division; Dr. Lumsden told of the effort made to stimulate rural health work in the more backward areas; and Dr. Lloyd explained the work of the division of reports and statistics. In connection with Dr. Frost's address, the party visited the whole system of the Washington water supply; and in relation to Dr. Stimson's address a most interesting day was spent at the great Hygienic Laboratory, where Dr. McCoy and his assistants demonstrated the routine and research work of the different departments of that well-known institution.

The last days in Washington were spent in learning of the work of the other Federal Departments whose activities are related to health. Dr. Davis explained the work of the Bureau of Census (Department of Commerce), and Dr. Ditewig, of the Bureau of Animal Industry, the national system of meat inspection. Dr. Dunbar, of the Bureau of Chemistry, gave a most instructive exposé of the many lines of activity of that department, while Miss Grace Abbott explained the health work of the Children's Bureau of the Department of Labour.

A considerable number of visits broke the continuity of this series of addresses, and the party was able to inspect many of the beautiful public buildings of Washington, as well as the Mental Hospital, the splendid new Walter Reed Military Hospital, and the Naval Medical School under Captain Butler; several automobile trips revealed the amenities of the district and the ample facilities provided for public recreation. One afternoon was set aside for a visit to Washington's home at Mount Vernon, and the majority of the members were also able to visit the Unknown Soldier's tomb at Arlington.

During the first phase in Washington, the party was entertained by Mr. Wadsworth, the Assistant Secretary of the Treasury (to which department the Public Health Service is attached) who took the opportunity to welcome the party and wish them a successful tour. The helpful and willing kindness of Dr. Draper and Dr. Stimson, with whom the party came most in contact, made the period in Washington one of the happiest, most instructive and most memorable of the tour.

In the Southern States. — To enable a more detailed and personal study to be made of the intricacies of State Health activities, the party was now broken up into three groups of eight, which groups dispersed on September 23rd on to the States of Virginia (Group I), North Carolina (Group II) and Alabama (Group III). In order to have some record of the work of these groups and of their impressions, each was invited to nominate a reporter. I have circulated their three reports to the members of the Committee; under these circumstances a general statement only need be given here.

In all three States — which, it will be recalled, are entirely autonomous in internal matters, including health — the first seven to ten days were spent at the State capitals in a study of the administrative systems and organisms. In Virginia, the Health Commissioner, Dr. E. G. Williams, welcomed the group personally, after which Governor Lee Trinkle gave an address of greeting in the State capitol in Richmond, followed by an explanation of the system of State government by Colonel Keiley. The next ten days were spent with the members of different departments of the State Health Board, the group being generally in the care of Dr. Roy Flannagan, the Assistant Commissioner; during this time the members were enabled to get a clear idea of the system of appropriations, legal powers, activities and institutions of these departments, and were now ready to "take the field", the tour into the rural districts beginning on October 4th.

Programmes on similar lines had been prepared by Dr. W. S. Rankin, the State Health Officer of North Carolina, at Raleigh; and by Dr. S. W. Welch, the State Health Officer of Alabama, at Montgomerie, where the group was welcomed on arrival by Judge Mayfield, and afterwards taken to visit the State Legislature in session.

After this introductory period, the groups spent nearly three weeks travelling through their respective States and studying the local problems — here malaria, there hookworm disease, elsewhere the provision of better sanitary fixtures in negro dwellings, and so forth. This was essentially a rural and institutional phase, although a number of quite considerable townships were taken as centres from which to study the surrounding countryside. The main sanitary problems seen were those of all sparsely populated, subtropical countries — as indeed these Southern States might well be called in the hot season.

These tours through the three States enabled the members to appreciate the vast extent of the country and the magnitude of some of the tasks, such as the anti-malaria campaign. In each case, officers were detailed to act as guide and friend to the groups, as, for example, in Virginia, where Dr. L. L. Williams (a Public Health Service Officer seconded to the State for anti-malaria work, and himself an ex-member of the recent Malaria Interchange in Italy) and Dr. C. A. Kane (of the International Health Board) conducted the group throughout. For the longer journeys

trains were used; but many of the visits were made by automobiles, which were universally placed freely at the disposal of the members.

In Virginia, the tour included Charlottesville (Dr. Keister, Health Officer), Roanoke, Pulaski, Newport News, Norfolk, Suffolk and Emporia, while mention should also be made of the interesting outline of town practice in Richmond itself given by Dr. E. C. Levy.

In North Carolina, Ashville was first visited, followed by Charlotte, Gastonia, Kinston, New Bern and Goldsborough.

In Alabama perhaps the widest circuit was made, involving visits to Troy, Newton, Mobile, Birmingham and Talladeega. In Birmingham an opportunity was afforded of seeing the industrial hygiene work in the great foundries.

Throughout all these journeys, and in every township without exception, the reception given to the members was cordial in the extreme; receptions were given on innumerable occasions by the authorities, by private organisations and clubs, and often by individuals, and the warmth of welcome throughout was more than gratifying. In several cases members of the groups were requested to give addresses in the universities; while information as to the purpose of the party (and also as to the work of the League) was widely and extensively sought.

At the end of their visits in the Southern States the groups, travelling north, halted at Baltimore to spend two very interesting days, — in part at the renowned Johns Hopkins School of Hygiene, where Professor W. H. Welch had arranged a most attractive programme to demonstrate the scheme of instruction given to his students by each of the chiefs of the different departments; in part with Dr. Jones, the City Health Officer, who had arranged to demonstrate the large new water and sewage-disposal plants of the city.

In the Northern States. — The arrangements for the Northern States were on a somewhat different plan.

The first eight days were again spent in studying the State organisations at the capitals, viz., at Boston, Albany and Harrisburg; but after this period municipal health department practice was taken up, at first in a small town for some eight days, then in a large industrial city for two weeks.

The Massachusetts group was received at Boston by the State Health Commissioner, Dr. Eugene Kelley, and proceeded in due course to New Bedford, where a particularly interesting week was spent in that small town, in the hands of Mr. Kirschbaum, the agent of the Health Board. On returning to Boston to study the city health scheme, the members soon appreciated how difficult a problem the large enclaves of aliens are in these great industrial cities. In Boston, where the arrangements were made by Dr. Mahoney, the City Health Officer, the opportunity was taken to attend the opening meeting of the Harvard School of Hygiene, while on another occasion, Mayor Curley invited their presence at the opening of the large new municipal hospital laboratories, at which function they were privileged to listen to an address by Dr. William Mayo, the well-known Rochester surgeon. During the Boston phase, also, the Lawrence Experimental Station was visited.

The New York group was received in Albany by Dr. Matthias Nicoll, the State Health Commissioner, and later by Governor Albert E. Smith. The members pursued their small-town studies in Syracuse under Dr. F. W. Sears, proceeding later to New York City, where Dr. Monaghan and his officers of the City Health Department made the necessary arrangements. This group had an interesting journey from Albany to Syracuse via the Adirondack Hills, where the opportunity was taken to inspect the splendidly endowed sanatoria at Saratoga Springs and Saranac Lake.

In Pennsylvania, the group was welcomed to Harrisburg by Governor Gifford Pinchot and Dr. Chas. H. Miner, the Secretary of Health. It is pleasing to refer to the kindness and hospitality shown by both these gentlemen so long as the group remained in Harrisburg. The small-town studies were carried out, and very strenuously, at Allentown, with Dr. Butz; while the large city selected for examination was Philadelphia, where Dr. Blair Spencer showed the same interest in opening all the doors of his organisation as had come to be expected in Pennsylvania. This group was also entertained officially by the Mayor and Corporation.

In general, the studies in the Northern States were more intense, and naturally so. Instead of wide rural areas, the predominating fact in the north is the great industrial town, densely populated and with large elements of foreign nationality, requiring a network of clinics and all the correlated services. As compared with the south, this period of study was relatively congested, but a wealth of information was made available; and the literature and reports given to the members — in some cases specially prepared at great pains — will serve them for long as an index to which to refer for precise data on those matters which they actually studied on the spot.

The groups reunited in New York City on November 25th, and spent three profitable days in the port with Dr. Grubbs and Dr. Billings, of the Public Health Service, one day observing the medical arrangements in connection with the examination of immigrants at Ellis Island, and two days on quarantine work — inspection of incoming vessels, cyanogen chloride disinfection of ships, etc., and in inspecting the premises and equipment of the quarantine service On the conclusion of these visits the official programme terminated, but on account of the generally expressed desire on the part of members to visit certain institutions in New York, arrangements were made whereby the Rockefeller Institute was visited, Dr. Carrel (in Dr. Flexner's absence) arranging a most interesting day's exhibit of all the varied researches being carried out there; and the members were introduced to Dr. D. B. Armstrong, executive officer of the invaluable National Health Council, the centre of all the voluntary organisations in the United States.

The remainder of the time in New York was spent by individual members in visits to local institutions or organisations in which they were particularly interested and which they had not previously had an opportunity to investigate. During this time also they were hospitably entertained to a farewell dinner (at which attended some 100 distinguished guests) by the Rockefeller Foundation, under the presidency of Dr. Geo. Vincent, and with Mr. John D. Rockefeller jr. also present.

The European members left New York, three on December 4th, the remainder on December 12th, reaching France on December 22nd. The members from Latin America returned individually about December 12th.

In retrospect, the tour was not only one of intense interest in itself, but provoked very lively interest wherever the groups travelled, an encouraging fact for the isolated health officers in rural districts. The Press, always eager in America, made much of the visitors, and numerous articles were published as to the health activities of the League, consequent on statements given on request by the representative of the Health Section. The latter divided his time between the various groups and was able to meet all State and many of the City Health Officers and their staffs, while he also delivered an address on the work of the Health Organisation of the League to the American Public Health Association at its large annual meeting in Boston, and many others to medical and other societies.

The members who travelled to Europe met in Conference at Geneva on December 27th, 1923 and sat until January 2nd, 1924. Each member read a paper on some aspect of public health work in America in which he was particularly interested, which was followed by a general discussion. The minutes of the Conference, which will be submitted in the first place to Surgeon-General Cumming, contain the papers and the gist of the discussions. The last few days were spent in studying the League organisation and the International Labour Office and its various departments and activities; and in critically discussing the three "Group Reports" and the whole of the Interchange scheme itself from the point of view of organisation, a discussion at which Professor Gunn, Director for Europe of the International Health Board, and Mr. Elliston, of the British Society of Medical Officers of Health, which is arranging the forthcoming Interchange in Great Britain, were also present. On January 3rd, eight members left for Belgium, where they have spent a short period of twelve days making a rapid survey of Belgian health work, on an invitation extended by M. Velghe to those members whose co-nationals have not hitherto visited Belgium in an Interchange.

An estimate of the total costs of the American tour, including the Conference, shows it to have approximated some $38,000, which is equivalent to some $1,500 per individual participant.

As the detailed programmes of the groups form a bulky total, and as the second group report contains a fair summarised sample of the work of a group, their programmes are here omitted, as also is any technical detail regarding health work in America. This is also given in brief in the group reports.

3. The Committee will perhaps be interested by the reminder that during the last fifteen months, *i.e.*, since the system came into operation, no fewer than 104 medical officers from 27 various countries have been able to participate in the general and specialist exchanges. I fear that during the current year the very considerable increase in the cost of travelling on the Continent will prevent you from admitting so many candidates. Indeed, the expenses connected with the American Interchange, in spite of the long duration (100 days) and the sea passage, did not exceed by more than 50 per cent. the budget of an 11-weeks General Interchange in Europe.

The Provisional Committee has approved the proposal of arranging during 1924 an Interchange in the Far East. The Far Eastern Association of Tropical Medicine discussed this proposal at its session held last October, and, while warmly welcoming this decision, resolved to recommend to the Health Committee that a General Interchange be organised at the time of the next Conference of the Association, which is to meet in Tokyo in the autumn of 1925. The intention of the Committee to hold a Far-Eastern Interchange was seriously considered by the Japanese Government, which, if I am rightly informed, intended making elaborate arrangements, including the voting of special credits for the purpose. In view of the terrible catastrophe which occurred last summer, any such plans naturally were adjourned; but I am very happy to inform the Committee that the Japanese Government entirely concurs with the Far-Eastern Association's proposal for holding an Interchange in 1925. Moreover, it views with satisfaction the possibility of the organisation by us of a limited Interchange this year, to which it will be prepared to commission one of its medical officers. The Committee may wish, indeed, before incurring the expenditure, and assuming the responsibility of the more extended arrangement of 1925, to gain experience by inviting from five to eight sanitary administrations of the Far East to commission some of their specialist medical officers to a limited Interchange of six weeks' duration. I venture to suggest that this Interchange be made available to Port Medical Officers and that the programme be so arranged as to assist in the development of any plans which the Committee may adopt as regards the establishment of a Centre of Epidemiological Intelligence in the Far East.

4. At the sessions of the Provisional Committee the question of individual missions was often discussed. It was agreed that the organisation of such missions was more difficult, as it required, on the one hand, a very careful selection of the candidates and, on the other, it would necessarily have to be limited to a few candidates each year. Indeed, while the Public Health Services were willing to facilitate at stated periods the study of the work of the sanitary administration of their countries by a large group of foreign officers, they might not be prepared to receive individual visitors throughout the year. As, however, the system of Interchange is being continually experimented with, a special type was inaugurated in 1923 in the form of a "Bacteriological Interchange". Twelve senior bacteriologists, some of them Professors of Bacteriology or Deputy-Directors of State Institutes, have been given grants to enable them to study at one or several Institutes of Public Health in foreign countries. With one exception, the participating officers were bacteriologists in charge of Public Health Laboratories, and they gave their time during the Interchange to the study of the laboratory methods used in the visited institutes, as well as to the practice of their administration. It was not intended, nor was it possible, that facilities should be given them to engage in any research work. From the reports received it seems that real benefit was derived, both for the individual bacteriologists and for the institutes under their charge.

Yet it would perhaps not be easy to extend the same system of individual missions to the other branches of Public Health Service. Such missions, if they are to be included in our system, should serve a double purpose, namely, the report prepared on the basis of the study should bear on a subject of importance to the Public Health Service and be also useful from the point of view of international health. I believe it is possible to specify the subjects which are under the examination of the Health Organisation and on which information is also being sought by national or communal Health Services, and it is also possible to obtain a list of candidates whose experience would qualify them for such missions. In one or two instances individual applications have already been accepted, and I beg to suggest that sanction be given to the trial extension of this system in the direction indicated.

It would be highly desirable also to repeat this year an Interchange for malaria specialists in connection with the work of the Malaria Sub-Committee or the Expert Committee connected with it. The experience of last year has shown how valuable the Italian Interchange has proved; it has shown also that such a specialist visit should be limited to experienced experts.

A suggestion was made further as to the advisability of holding an Interchange for Medical Officers responsible for the health administration of large urban areas, such as towns of at least 100,000 inhabitants. The visits, which might be arranged on the same model as the specialist Tuberculosis Interchange, would be limited to problems of municipal administration, including the housing problem, and it might be advisable to allow the Medical Officers to be accompanied by technical advisers, such as city architects or chief sanitary engineers.

The development in these new directions is undoubtedly bound up with the budgetary possibilities and I fear that it would be difficult to extend our system unless the credits at our disposal were to be increased.

5. As the members will recall, at the end of every Interchange a final Conference is held in Geneva, at which an opportunity is given to the participating officers to exchange views on the lessons learned and to make suggestions. The Conference which ended the American Interchange has shown that the reports presented are of real value and that a considerable number, if published, could form the nucleus of an "International Interchange Library", which would prove of great utility for the Public Health Services in general, and for those medical officers in particular who did not participate in these exchanges. I have requested the chiefs of the sanitary administrations who had so far commissioned officers for the various Interchanges for copies of the reports presented by those officers on their return home. Obviously, special authorisation would have to be obtained for their publication in a form determined by the sanitary administration in question. In this "International Interchange Library" the reports on special individual missions might also be included, and these two series, together with the volumes of addresses and memoranda which are now being prepared for each visit by the National Organising Committee, should prove of real value, both as technical documents and as a means of extending the close contact brought about by the system of Interchanges. I am confident that means will be found to enable the publication to be started, and continued, should the Committee decide in favour of it.

Annex 3.

NOTE ON THE WORK OF THE MIXED SUB-COMMITTEE OF THE HEALTH COMMITTEE AND THE ADVISORY COMMITTEE ON THE TRAFFIC IN OPIUM

(Second Session, Geneva, September 5th to 7th, 1923.)

By Dr. CARRIÈRE, Chairman of the Sub-Committee.

The members of the Health Committee will, no doubt, remember that the Mixed Sub-Committee, at its meetings in January 1923, examined the various methods of enquiry which could be employed to ascertain the legitimate requirements of a country in respect of narcotics [1].

The Health Organisation agreed to study these various methods; for this work it enlisted the help of Professor Knaffl-Lenz, of Vienna, a specialist of great eminence, whom we wish to thank for his valuable assistance.

Dr. Knaffl-Lenz reached the conclusion that all three methods proposed were defective, and could not give results of sufficient accuracy. These defects have already been mentioned in our report, and need not be discussed again here. We will merely refer to a remark made by Dr. Knaffl-Lenz in regard to the method of enquiry based on the general morbidity figures of a country — established, for example, by reference to the statistics of insurance companies — and on the figures of consumption by hospitals. As Dr. Knaffl-Lenz rightly pointed out, it is necessary at the outset to define exactly what is meant by morbidity; moreover, the needs of the population as a whole in respect of narcotics are not the same as those of patients undergoing hospital treatment, and vary according to the class of the population, the temporary prevalence of a particular disease and the habits of medical practitioners. These considerations are sufficient to show the inadequacy of the method.

As a conclusion to his enquiry Dr. Knaffl-Lenz suggests a method which consists mainly in utilising information supplied directly by hospital authorities, chemists and doctors. But in order to ensure that the replies are honestly made and the information given is correct, he proposes that narcotics should only be supplied when prescriptions are made out on special forms to be issued to the doctors by the Government, and to be returned by the chemists to the authorities responsible for their supervision. In this way the quantities of narcotics dispensed by chemists could be ascertained with the maximum of accuracy: by adding the quantities consumed by the hospitals — there is here no doubt as to the correctness of the replies — it would be possible to secure a sufficiently close approximation to the legitimate requirements of a country. The figures thus obtained could be checked by calculating the quantities of narcotics consumed by the members of sick-insurance funds (in countries where these organisations are sufficiently developed to supply a sound basis for an enquiry of this kind), both in the case of patients treated at home and those treated in hospital; if the figures obtained in this way corresponded closely with the information supplied by hospital authorities, chemists and doctors, this would show that the latter was accurate and could be generally utilised.

It may be objected that the time spent by patients in hospitals varies from case to case for different reasons — some financial, and others directly connected with the nature of the illness treated — and that this is a circumstance liable to vitiate the results of the investigation. To meet this objection, Dr. Knaffl-Lenz suggests that the consumption of narcotics should be calculated not per patient per annum, but per patient per day's treatment. The figures he has collected show that, by employing this method, much the same results are obtained for the various hospitals, whereas wide differences appear if the figures per patient per annum are compared.

It has also been pointed out that, in calculating accurately the legitimate needs of a country in respect of narcotics, account should be taken of codeine, a drug which, in many cases, might take the place of the other opium derivatives specified in the Convention. It, therefore, seems indispensable that the enquiries should also take account of codeine, and that the personsresponsiblefor these enquiries should bear this recommendation in mind.

Such was the principal question studied by the Mixed Committee (consisting of Dr. Chodzko and Dr. Carrière for the Health Committee and Mr. Campbell and M. Anselmino for the Advisory Committee on the Traffic in Opium) during the session which it held at the beginning of last

[1] See our report published in the *Minutes of the Fifth Session of the Health Committee* (page 73). We may point out that the Sub-Committee decided that the only legitimate requirements were medical and scientific requirements, but that this definition was not accepted by one of the members, Mr. Campbell, delegate for India, who made the most explicit reservations on this point,

September. In addition to the results of Dr. Knaffl-Lenz's investigations, the results of the enquiries carried out in certain countries — particulars of which were kindly supplied by the Secretariat — were also laid before the Sub-Committee. The latter found that the information it obtained from different sources corresponded so closely that a preliminary approximate figure representing medical and scientific requirements could be fixed forthwith, without awaiting results of further enquiries [1]. This, naturally, does not render fresh enquiries unnecessary, and the Sub-Committee recommends the method described above to countries which may wish to organise them.

After a long discussion, during which Mr. Campbell repeated the reservations which he had already made in regard to the definition of legitimate needs, the Sub-Committee embodied its views on this first question in a resolution, the text of which will be found below.

But the question of enquiries and of determining legitimate requirements was not the only one with which the Sub-Committee had to deal. It also discussed the question of diacetyl-morphine or heroin, which figures in the list of drugs referred to in the Hague Convention; it is an even more poisonous product than morphine, being liable to give rise to a veritable "heroin habit", and therapeutics could apparently dispense with it without any difficulty. The Sub-Committee therefore decided to recommend the various countries to consider the possibility of completely prohibiting the manufacture of heroin and it adopted a resolution to this effect. This suggestion has since been submitted by the Secretariat to the States belonging to the League of Nations.

The Sub-Committee also dealt at length with cocaine and with the possibility of regulating and limiting its use. The resolutions embodying its opinion on these points will be found below.

It also considered whether the provision in the Hague Convention (Article 14, *b* and *c*), exempting from supervision preparations containing less than 0.2 % of morphine and less than 0.1 % of cocaine or heroin, should be revised with a view to bringing such preparations under the ordinary régime. This provision seems to leave a loophole for fraudulent practices; as many of the preparations in question are solutions, it would be possible by distilling them to obtain considerable quantities of morphine, cocaine and heroin, which would thus escape all supervision.

It is stipulated in Article 14 of the Convention that its provisions "shall apply to all new derivatives of morphine, of cocaine or of their respective salts, and of every other alkaloid of opium which might be shown by scientific research, generally recognised, to be liable to similar abuse and productive of like ill effects" (in passing, we may point out that this text is rather badly drafted and should be revised). Moreover, in a session held at the beginning of 1922, the Council of the League of Nations adopted the following resolution: "The Advisory Committee on Traffic in Opium should be requested to extend its investigations to include not only the drugs mentioned in the Convention of 1912 but also all dangerous drugs, of whatever origin, which produce similar effects, and to advise it (the Council) as to the desirability of convoking a further international conference of States which are parties to the Convention as well as States Members of the League of Nations, with a view to drawing up a Convention for the suppression of the abuse of such drugs."

In response to this suggestion, the French Government, on April 12th, 1922, forwarded to the Secretariat of the League of Nations a list of chemical products which in its opinion produced effects similar to those of morphine and cocaine. When this list was laid before the Advisory Committee on the Traffic in Opium, the latter decided to refer it, for consideration, to the Mixed Sub-Committee, which was thus called upon to deal with the question. It appears from the investigations made by Dr. Knaffl-Lenz that the products enumerated in the French Government's list do not come under the Convention, except artificial or synthetic cocaine; by this term is meant cocaine prepared on the basis of ecgonin, an alkaloid derived from a species of coca grown in Java. This cocaine has the same chemical formula as that derived from Peruvian coca. The Advisory Committee on the Traffic in Opium decided at its third session that *cocaine should be defined by its chemical formula* and not by its origin; in consequence, cocaine described as artificial comes under the provisions of the Convention and the French Government's suggestion, as far as this drug is concerned, was unnecessary. None of the other products specified in the French Government's communication (dionin, peronin, apomorphine, eupomorphine, which are various substitutes for cocaine) appear likely to give rise to abuse, as they do not produce the state of euphoria which leads to the formation of a habit and to toxicomania. The French Government's initiative is, however, to be commended in principle, and the Sub-Committee considers that it would be desirable for countries to forward periodically to the Secretariat of the League of Nations a list of the products which in their opinion may have the same injurious effects as the products mentioned in the Hague Convention.

The above are the various questions with which the Sub-Committee was called upon to deal during its last session. The results of its discussions are summarised in the following resolutions, which we submit to the Health Committee to enable it to give an opinion on them if it thinks fit.

I. For the purpose of determining the legitimate requirements of the various countries in narcotic drugs, the Mixed Sub-Committee, after having examined the figures submitted by the Secretariat, has ascertained that the correspondence existing between these data was marked

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[1] This applies only to opium and morphine. As regards cocaine, the figures communicated to the Sub-Committee have not been such as to allow definite conclusions to be reached.

enough to fix immediately for opium and all its derivatives, including the quantities of opium transformed into codeine and other products, a preliminary approximate figure corresponding to medical and scientific requirements. *This figure, 600 milligrammes (about 10 grains)* of raw opium per inhabitant per year, should, however, be regarded as a maximum. In view of the variable amount of morphine contained in raw opium, this figure has been calculated by taking a content of 10 % as an average.

As regards cocaine, the Mixed Sub-Committee regrets that the data which it has received are not sufficient to enable it to proceed to a similar determination at the present time.

If the States should consider it necessary to undertake new enquiries as regards their respective requirements, the Mixed Sub-Committee recommends the application of a method consisting in utilising the information furnished direct by hospitals, pharmacists and medical practitioners. They would point out, however, that this method will give accurate results only if the narcotics are prescribed on special forms. The Mixed Sub-Committee again points out that in view of the importance of the prescription of codeine in certain countries, it would be well to include this alkaloid in the enquiry, and, in general, all the derivatives of opium employed in therapeutics.

II. *Diacetyl-morphine (heroin)* is a very dangerous drug, more toxic even than morphine, and even more dangerous as regards the forming of a drug habit. Since many pharmacologists and clinical practitioners admit that heroin can be dispensed with in therapeutics, the Mixed Sub-Committee recommends that the possibility of entirely prohibiting its manufacture should be considered.

III. In the present state of our knowledge of therapeutics, *cocaine* cannot always be replaced by its substitutes, but the Sub-Committee is of opinion that its use should be restricted to those branches of medicine where it is indispensable, viz. laryngology and ophthalmology, and that the possibility of its prohibition in dental practice should be more especially considered. The Sub-Committee is, moreover, of opinion that the use of cocaine should not be left to the patient. It also considers that the sale of patent medicines containing cocaine should only be permitted on medical prescription.

Finally, in order to prevent contraband and illicit traffic and to facilitate supervision, the Mixed Sub-Committee recommends that the putting on sale of cocaine should only be permitted in the form of (sterilised) solutions.

IV. The provisions of the Hague Convention are only applicable at present *to preparations containing less than* 0.2 % *of opium and less than* 0.1 % *of morphine or cocaine.*

The Mixed Sub-Committee believes that this provision may to a certain extent facilitate illicit traffic in narcotics on account of the fact that it will always be possible to distil a pure solution of one of these narcotics, and thereby to recover a considerable quantity of the drug, which would escape any measure of supervision. The Sub-Committee calls the attention of the Advisory Committee on Opium to this fact.

V. The French Government, in accordance with the decision of the second Assembly of the League of Nations, has submitted to the Secretariat a list of morphine and cocaine derivatives which, in its opinion, have the same harmful effects as the drugs mentioned in the Hague Convention.

Having noted this communication, the Mixed Sub-Committee is of opinion that the provisions of the Convention should not be applied to these products, with the exception of those derived from ecgonine viz:

ethylbenzoylecgonine or ethylic coca;
propylbenzoylecgonine;
butylbenzoylecgonine;
cinnamylcocaine.

Dionin and peronin are products not widely used, which have an effect similar to that of codeine, and which, so far as experience has shown, do not produce the condition of euphoria which leads to the formation of a habit There is, therefore, no reason to fear their abuse. Apomorphine and eupomorphine are not narcotics, but powerful emetics.

As regards artificial cocaine, the Mixed Sub-Committee has taken note of the decision adopted by the Advisory Committee in the course of its third session, according to which cocaine should be defined by its chemical formula, not by its origin, with the result that artificial cocaine (which has the same chemical formula as cocaine derived from the coca grown in Peru) falls within the provisions of the Convention.

As regards the substitutes for cocaine, enumerated in the schedule, they have nothing in common with cocaine except their anæsthetic action and do not stimulate the central nervous system and thereby lead to abuse. With the exception of novocaine, which has rendered the use of cocaine for local anæsthesia almost superfluous, the other products mentioned are hardly ever used, owing to their injurious subsidiary effects on the patient.

VI. The Mixed Sub-Committee considers it necessary that the States should forward periodically to the Secretariat of the League of Nations a schedule of the new opium and cocaine derivatives which in their opinion may have the same injurious effects as the products mentioned in the Hague Convention and should consequently be brought within its provisions.

We append to this note the conclusions contained in a memorandum submitted to the Committee by Professor Knaffl-Lenz, in which, after studying the causes contributing to the abuse of opium and morphine, he explains the methods which should, in his opinion, be employed to combat this abuse. It contains interesting suggestions which might be profitably discussed by the Health Committee.

The questionnaires which it is proposed to send to the hospitals and to the sickness-insurance offices are given in a second Appendix.

Appendix I

CAUSES WHICH LEAD TO THE ABUSE OF OPIUM AND MORPHINE AND METHODS OF DEALING WITH THEM.

Summary and Conclusions of Dr. Knaffl-Lenz's *Memorandum.*

According to Dr. Knaffl-Lenz, the factors which favour and directly lead to the morphine habit may be summarised as follows:

(*a*) Imprudent medical dispensing (especially during the war).

(*b*) Damage done to the nervous system by exhaustion, which is partly due to the industrial life of to-day and the ruthless struggle for existence. The damage to the nervous system increases not only the craving for drugs which operate upon the nervous system, but also the propensity to chronic morphinism. (This cause most probably plays an important part in the United States. According to American reports, morphinism has spread since prohibition.) The majority of neurologists take the view that only persons with a special propensity become chronically addicted to morphia.

(*c*) Seduction by morphine addicts, and more particularly smugglers, in order to acquire fresh customers.

(*d*) Immoral reasons, desire for sensation, and the mistaken but widely held opinion that the eating of opium and morphine excites the imagination sexually, though this is certainly not the case among the white races.

From these causes of morphinism may be deduced the methods which should be used in combating the habit, *i.e.*:

(1) Limitation of the employment of opium and morphine for medicinal purposes as far as possible by the use of substitutes which do not lead to the chronic acquirement of the habit.

(2) Prohibition of the production of heroin, which is dangerous and therapeutically not indispensable.

(3) General and constant instruction of medical students and doctors with regard to the dangers of the treatment of patients with morphia and to the nature and treatment of morphinism.

(4) Instruction of the public that there is no disgrace in morphinism, so that morphine addicts can be the sooner induced to submit to medical control and to obtain the quantity they absolutely need by legitimate means. This would be the most effective manner of combating smuggling.

(5) Installation of special wards in hospitals, where well-to-do patients and the very poor could be treated by a properly conducted withdrawal cure or could obtain their minimum requirements of morphine.

(6) Fixing of the world requirements of morphine and its derivatives for the treatment of the sick and for supplying the drug in a legal manner to persons who are already chronically addicted to opium or morphine.

(7) Restriction of world production to these quantities. Yearly diminution in these quantities so as only to cover purely medicinal needs.

(8) The introduction of special prescription forms for opium and morphine to be issued to medical practitioners by the State and to be returned by chemists for the purpose of controlling and fixing such quantities as are medicinally necessary. The introduction of forms of this kind would probably result in a decrease in the prescription of opium and its derivatives.

(9) As soon as the medicinal requirements have been fixed in this manner, it might be found advisable to permit the prescription of dionin and codeine on the ordinary forms so as to encourage the use of them as substitutes for morphine.

(10) Rigorous application of the measures proposed by the Commission with regard to the supervision of importation, exportation and manufacture.

(11) It would be extremely desirable that the various countries should give notice every year of the factories from which they propose to procure their requirements of opium preparations and of the quantities which are absolutely necessary. By this means factories could be forced to import only such quantities of raw opium as are necessary for carrying out their contracts, so that the over-production of opium preparations — which offer by far the best opportunities for smuggling — could be substantially decreased.

After taking note of Dr. Knaffl-Lenz's statement and its conclusions, the members of the Mixed Committee belonging to the Health Committee expressed their agreement with its principles, although not with all its details.

Appendix II.

FORM FOR HOSPITALS.

A.

Number of patients admitted annually . . . . . .
Number of days' treatment per patient per year . . . . . .
Indication of the different sections in the hospitals . . . . . .
. . . . . .
. . . . . .

B.

grammes

Total annual consumption of opium, of the derivatives of opium and of cocaine:

Opium (extract, tincture, powder, etc.) expressed in medicinal opium . . . . . .
Heroin (diacetyl-morphine) . . . . . .
Morphine (specify which salts) . . . . . .
Codeine (specify which salts) . . . . . .
Other opium products or derivatives of morphine . . . . . .
Cocaine (not including substitutes such as novocaine, etc.) . . . . . .

(Under cocaine, when possible, indicate separately the consumption of the laryngological and ophthalmological section, as well as the number of patients and the days of disease.)

INSURANCE PATIENTS.

A.

Number of persons insured (indicate whether children are included) . . . . . .

B.

grammes

Total amount of opium, opium derivatives and cocaine prescribed by the physicians for the persons insured:

Opium (extract, tincture, powder, etc.) expressed in medicinal opium . . . . . .
Heroin (diacetyl-morphine) . . . . . .
Morphine (specify which salts) . . . . . .
Codeine (specify which salts) . . . . . .
Other opium products or morphine derivatives . . . . . .
Cocaine (not including substitutes such as novocaine, etc.) . . . . . .

C.

Number of insured persons treated in the hospitals annually . . . . . .
Number of days of treatment of insured persons per year . . . . . .

Annex 4.

REPORT ON THE WORK OF THE EPIDEMIC COMMISSION

Submitted to the Health Committee on February 13th, 1924.

At the last meeting of the Health Committee at Paris in May-June 1923, a report was submitted by the Medical Director containing full and detailed information of the activities of the Epidemic Commission up to that date. At that time the Commission had three fields of activity: in Poland, Russia and Greece.

The work in Poland has now come to an end, and the epidemic office in Warsaw has been liquidated (January 1923). The hospital building programme and the installation of other sanitary establishments, which were made possible by the financial assistance of the Epidemic Commission, have been completed and are in working order. All these establishments have been handed over to the Polish health authorities, and they should prove of the utmost value in assisting the local health administration in the prosecution of anti-epidemic activity in the provinces along the eastern frontier.

It is proposed shortly to issue a complete report summarising the activities of the Epidemic Commission from its inauguration in 1920 to the present time. In this report the work of the Commission in Poland will be described at some length. The claim is justified that the assistance given, with relatively limited resources, to the Polish administration has been an important factor in securing the comparatively satisfactory health conditions that now obtain. The periodical reports that are issued by the Health Organisation of the League of Nations show that the prevalence of epidemic disease in Poland has now assumed almost normal proportions.

Our office in Moscow has maintained close contact with the Russian and Ukrainian health authorities and has obtained valuable and interesting epidemiological information regarding the incidence of disease in the territory of the Soviet Republics. Dr. Pantaleoni, who was in charge of the office until September 1923, also performed most useful services in helping to organise the courses of instruction for medical officers of health which were held in Moscow and in Kharkoff. As the Committee is aware, these courses were financed mainly by the League of Red Cross Societies. They have proved of the greatest utility, and it is much to be hoped that it will be possible to arrange for further courses in the future.

The Epidemic Commission has also rendered assistance to the Committee of Russian Scientists, which was appointed by the Moscow Health Administration to investigate the problem of cholera in Russia and with which Professor Zinsser collaborated during his visit to Moscow in August last as a delegate of the Epidemic Commission. Financial assistance afforded by the Epidemic Commission has enabled an important investigation to be started with regard to the efficacy of buccal vaccination against dysentery, cholera and fevers of the typhoid group. This work is being directed by a committee of which Professor Tarassevicz is Chairman and Dr. Lubarsky is Secretary. This work is still only in its preliminary stage, but already interesting and suggestive results have been obtained. The last report received from Dr. Lubarsky, dated December 1st, 1923, gives some interesting details regarding an outbreak of bacillary dysentery that occurred

in an infirmary in Petrograd. The disease appears to have been chiefly of the Shiga type, the Shiga bacillus having been isolated in 71 cases and Flexner's bacillus in four. On August 1st, vaccination by mouth was commenced. The vaccine used was in tablet form, each tablet containing 100,000 million organisms, Shiga, Flexner and His in equal numbers. Altogether, 1,000 persons were vaccinated and 1,500 inmates of the infirmary formed the control. The epidemic reached its height towards the middle of the month of August. The total number of cases of dysentery reported was 160, of which only two occurred amongst the vaccinated. There was little or no reaction among children and old people, but occasionally a well-marked though not severe reaction was observed amongst people from 20 to 45 years of age. This reaction consisted for the most part of gastric and intestinal disturbance; vomiting and diarrhœa were very rare. These results are in conformity with those observed by Colonel Gauthier in Greece.

The report which was placed before the Health Committee at its session in June described in detail the genesis of the Commission's activities in Greece; the valuable work which Dr. Haigh was performing as expert adviser to the central Greek health authorities was referred to, as was also the vaccination campaign which was being carried on under Colonel Gauthier's direction, ably assisted by Dr. Wroczynski. Dr. Wroczynski also gave the Committee a detailed statement regarding the then existing health conditions of the Greek refugees. Shortly after the Committee met, Dr. Haigh was recalled and was asked to undertake a preliminary study of the malarial situation and health conditions in Albania. His report on the malarial situation in Albania has been circulated to the members of the Committee.

Colonel Gauthier continued an energetic vaccination campaign on behalf of the Greek health authorities, and has submitted an interesting and informative report, which has been printed and laid before the Committee. The apparently very successful results obtained by buccal vaccination during outbreaks of dysentery and diarrhœa are very noteworthy. In several outbreaks the apparent immunity conferred by buccal vaccination is most striking, and it is interesting further to note that this measure appears to have well-marked therapeutic value in the treatment of cases of dysentery and enteritis. Full details are given in Colonel Gauthier's monograph where the general health conditions of the refugees during the year are referred to and mortality and morbidity statistics are given.

On the whole it would appear that the mass vaccinations in Greece achieved a remarkable success, and much credit is due to all concerned for the enthusiasm with which they were carried out.

Financial considerations have necessitated the closing down of the activities of the Epidemic Commission in Greece, but even were funds available it is doubtful whether the health outlook is sufficiently serious to warrant a continuation of our activities. This remark does not take into consideration the widespread prevalence of malaria, which at the present time is by far the most serious factor in the health situation of Greece. The limited resources of the Epidemic Commission have throughout made it quite impossible to envisage intervention on any large scale in the anti-malaria campaign.

A sum of £6,000 has been placed at the disposal of the Latvian Government to assist it in providing an adequate and modern port health installation in Libau. A description of this will be given when further progress has been made with the work.

The Health Committee, at its last session, approved the resolution that was proposed by Sir George Buchanan and which read as follows:

> "The Committee:
>
> "(1) Notes with approbation the useful work which has been carried out by the Epidemic Commissioners since the last session of the Committee, and in particular in connection with the serious outbreaks of infectious diseases which have occurred among the refugees in different parts of Greece;
>
> "(2) Notes also that it would have been impossible to carry out much of the work referred to without the sum which Dr. Nansen was able to hand over to the Epidemic Commission, and that the outbreaks in question could have been combated with still greater success had other funds been also available for the Commission at the earliest stage;
>
> "(3) Considers that this recent experience, together with the experience of the whole of the work of the Epidemic Commission since its inception, demonstrates that, if the Epidemic Commission is to be placed in a favourable position to deal with unexpected risks of spread of infection arising from sudden calamities or disasters affecting large populations, it should at least have some funds, not necessarily large, which can be drawn upon for immediate use when these conditions arise;
>
> "(4) Begs the Council to consider fully and favourably any proposal which would ensure that a small fund is kept by the League at the disposal of the Commission for emergency work to be utilised for the prevention of the spread of epidemic diseases in exceptional instances where such measures are suddenly called for alike in the interests of the public health of the world and for the strengthening of the public health organisation of countries which may require immediate assistance."

The above resolution was considered by the Council, which forwarded it to the Assembly, where it was discussed at some length.

The Assembly adopted the following resolution:

> "The Assembly,
>
> "Having considered Dr. Norman White's report and the report of the Secretary-General forwarding to the Council the recommendations of the Health Committee

submitted in accordance with the request of the Council formulated on August 31st 1923:

"Pays tribute to the work of the Epidemic Commission and associates itself with the people whom the Commission has helped and protected in expressing gratitude for the assistance rendered;

"Takes note that the work hitherto dependent upon voluntary contributions during a time of acute distress is likely to be arrested for lack of funds if the present decrease in the danger from epidemics should result in a diminution of contributions to an extent that made it impossible to provide urgent relief on the appearance of fresh epidemics;

"And recommends that the Council should, in case of need, study what resources could be placed at the disposal of the Health Organisation of the League of Nations to enable it to intervene immediately through the intermediary of its Epidemic Commissioners in the event of sudden epidemic outbreaks of exceptional importance which might involve political consequences."

The Health Committee will note that, though it has not been possible to place any definite funds at the disposal of the Commission to enable it to intervene in the event of serious epidemic outbreaks, the resolution adopted by the Assembly does in large measure meet the wishes expressed by the Health Committee at its last session.

The accounts of the Epidemic Commission up to the end of 1923 were audited in January 1924 by Messrs. Sutton & Co., chartered accountants. Their report, together with a statement regarding the present financial position of the Epidemic Commission, will be placed before the Committee.

During the first seven months of 1923 Dr. Norman White was absent on a mission to the Far East. On his return he assumed once more the post of Chief Commissioner. Dr. Gauthier, Dr. Haigh and Dr. Pantaleoni remained members of the Commission until December 31st, 1923, when financial considerations made it necessary to dispense with their services. The best thanks of the Epidemic Commission are due to these three gentlemen for the services they have rendered and for the work they have carried out, often in circumstances of very great difficulty and personal discomfort.

Annex 5.

THE WORK OF THE SERVICE OF EPIDEMIOLOGICAL INTELLIGENCE AND PUBLIC HEALTH STATISTICS.

Report submitted to the Health Committee on February 14th, 1924.

At the request of the Medical Director, I beg to submit the following report, which covers in some detail the various phases of the work of the Service of Epidemiological Intelligence and Public Health Statistics, and contains several suggestions for the development of its activities.

In a memorandum laid before the Provisional Health Committee at its sixth session, May 26th to June 6th, 1923, a statement was made of what appeared to me to be some important general considerations and a brief report was submitted on the preliminary work and the lines of immediate development. The present report covers the work during the period since that memorandum was approved.

May I take this opportunity of referring to the invaluable assistance which has been received from the various public health services and from the statistical offices? Such progress as has been made has been due in very large measure to this aid, which has been given in a spirit of willing co-operation. Conferences with statisticians and others immediately concerned in epidemiology and statistics have been made possible by the ministries of health and the public health services, and have been held at every stage and on every phase of the work. I am happy to state that there is every reason to believe that the work of the Service can be continued and developed on this co-operative basis

In view of the fact that the work of the Service is being conducted along several rather distinct lines, this report is for convenience divided into four parts, under the following sub-headings:

I. Epidemiological Intelligence, including:
   1. Current epidemiological reports and publications;
   2. Special epidemiological studies.

II. Reports on health organisation and current activities.

III. The study of official vital statistics and statistical procedure, including:
   1. Preparation of handbooks on official vital statistics;
   2. Studies on the comparability of statistics.

IV. Collective studies on public health statistics and statistical interchanges.

Several reports have been prepared containing statements on the comparability of vital statistics and on the first Collective Study of Public Health Statistics. These will be available for the Committee should it desire to refer to them. Copies of a handbook on the Official Vital Statistics of the Netherlands and of Reports on the Health Organisation and Administration in Germany and Austria will be sent to the members.

I. EPIDEMIOLOGICAL INTELLIGENCE.

In this section of this report I beg to present a brief account of the present state of the work of Epidemiological Intelligence, with certain recommendations under two sub-headings as follows:

1. Current epidemiological information;
2. Epidemiological studies on certain diseases.

Members of the Committee will recall that, in my memorandum to the Provisional Health Committee last May, a distinction was clearly drawn between the exchange of current epidemiological information (such as weekly, monthly or annual summaries) on the one hand, and, on the other hand, scientific studies on, for example, the world distribution of disease, or on its comparative epidemiology in different countries, or on the periodicity of epidemics. Bearing in mind this distinction, these two phases of the activity of the Service have accordingly been carried on separately.

Since the exchange of current intelligence depends in the last analysis upon the facilities for notification which the various countries possess, the growth of international intelligence of this character is limited to the pace at which the notification of disease develops within the countries themselves. The voluntary co-operation which the public health services have given in supplying current epidemiological reports to the Health Organisation for the purposes of exchange of information is a most encouraging indication of the possibilities for further development in this direction for practical as well as general purposes.

The establishment of more complete and prompter notification of disease prevalence in the Far East, as recommended in the report of the Chief Epidemic Commissioner as the result of the visit of the Mission to the far eastern countries, would undoubtedly greatly assist in the development of the exchange of epidemiological information.

1. Current Epidemiological Information.

The collection, compilation, and publication of the current official epidemiological information available in the various countries was, as I pointed out in my memorandum of last May, among the first activities of the Service to be taken up, not only because of its obvious importance but also because it had already been well begun, especially as regards the epidemic situation in the central and eastern European countries. Some augmentation of the work has been possible along these lines and I beg to make a brief presentation of its present status and some recommendations for its further development.

Sources of Epidemiological Information.

These and the general character of the information collected are as follows:

1. Through the co-operation of public health services and statistical offices, reports on the prevalence of notifiable diseases are now being transmitted regularly from countries and colonies The list of countries and colonies is as follows:

Europe:

Austria
Belgium
Bulgaria
Czechoslovakia
Danzig
Denmark
England and Wales
Esthonia
Finland
France
Germany
Greece
Hungary
Italy
Latvia
Lithuania
Netherlands
Northern Ireland
Norway
Poland
Roumania
Russia
Scotland
Kingdom of the Serbs, Croats and Slovenes
Spain
Sweden
Switzerland
Turkey (Constantinople).

Africa:

Algeria	Mauritius Island	Sierra Leone
Basutoland	Morocco, French zone	Tanganyika Territory
Egypt	Nigeria	Protectorate of Tunis
Gold Coast	Nyasaland	Uganda
Kenya and East African Protectorate	Northern Rhodesia	Union of South Africa
	Southern Rhodesia	Zanzibar.

America:

Brazil (Rio de Janeiro)	Mexico (Mexico City)	West Indies (British)
Costa Rica	Panama, Canal Zone	Saint Lucia
Cuba	Republic of Salvador	Saint Vincent
Ecuador	San Domingo	Grenada
British Guiana	United States	Trinidad and Tobago.
Republic of Haiti	Uruguay	

Asia:

Aden Protectorate (Arabia)	British India	Palestine
Ceylon	Iraq (Mesopotamia)	Siam
China (Hong-Kong)	Malay States (Federated)	Straits Settlements.
	Malay States (Unfederated)	

Australasia:

Australia	New Zealand.

For the most part, the reports received afford information for administrative and other divisions within the countries in considerable detail.

It has been possible to effect a lessening of delays in transmission in a number of instances, and reports from several countries are being received with greater promptness than before. In many cases the Service is being furnished with summaries in advance of publication.

As to the question of obtaining reports from other countries and colonies not included in the list given above, I may state that requests have been made for current epidemiological reports upon the public health services of practically all of these countries. Favourable replies from most of them have been received, and for Canada, the Netherlands and France as regards colonies, and several South American countries satisfactory arrangements are being made.

In addition, an increasing number of reports from large cities are being secured, especially from cities in countries in which reports for the entire areas are not available. Since current mortality data are available for a relatively small number of countries, a special effort is being made to obtain them from cities. At the present time the reports for mortality from all causes and a few of the more important diseases for a selected number of cities are currently published in the *Monthly Epidemiological Reports*.

2. A constant effort is being made to secure as complete a file as possible of special reports of an epidemiological nature and annual summaries and reports on infectious diseases, natality, mortality and population.

3. About 100 public health and medical periodicals are being received regularly.

4. The daily press is regularly scrutinised for telegraphic information upon which queries are made in special instances.

Recording Epidemiological Information in Health Organisation. — The information received is so varied with respect to form and contents that it has been necessary to experiment in order to find an economical and at the same time adequate method of recording the data for current use and for future reference. In general the following is the procedure: All information relating to the occurrence of cases and deaths from notifiable diseases is recorded as soon as it is received on suitable forms, a separate sheet being used for each disease in each country and subdivision thereof, so that the course of the disease and the latest report in detail may be seen at a glance. About 2,000 of these sheets are currently used. The data for immediately preceding years are summarised for comparison in a series of tables. Special data and epidemiological observations are indexed for reference, as well as the contents of statistical reports relating to morbidity and mortality. Medical intelligence of especial interest is also indexed and, when necessary, abstracted.

Queries for Detailed Information. — It has appeared advisable occasionally to request special and more detailed information when the reported occurrence of a disease seemed unusual or of particular interest. In some instances clerical errors in the reports received have been disclosed, in others mistaken or uncertain diagnoses have been reported, and in still other instances, interesting additional data have been furnished. I perhaps may remark that in no instance has the purpose of these queries been misunderstood and that in every case the information requested has been given willingly. The scrutiny of the data for these purposes is a considerable task and

requires the attention of specially qualified persons, and it has not been possible to develop this phase of the work sufficiently as yet. Arrangements are under way, however, for its prosecution on an adequate scale.

Publication of Epidemiological Information. — In accordance with the approval given by the Provisional Health Committee, two new series of *current* summaries were begun, as follows:

(1) A periodical summary of current epidemiological information supplied to the Health Section by the public health services of the different countries, published as a *Monthly Epidemiological Report.*

(2) An annual summary, based on current reports. The first summary of this nature was confined to the information for Europe, published under the title *Statistics of Notifiable Diseases in Europe in* 1922.

(3) To these should be added the *Special Epidemiological Reports* which had previously been published by the Health Section and which have continued to be issued when conditions seemed to warrant.

With reference to the first two series of publications, I would like to make the following observations:

(1) *The Monthly Epidemiological Report.* — Seven numbers have been issued, beginning with July 1923, to the date of this report. Doubtless it has been observed by members of the Committee that the publication, in addition to some increase in volume, has undergone some internal changes. These changes have been made without hesitation when it was believed that improvements could be gained, because it is thoroughly realised that there are many lacunæ in the publication, that it is still in an experimental stage and that it must continue so for some time to come. The *Report* has been sent to the public health service of nearly every country with a letter inviting criticisms and suggestions, and requesting opinions as to the general usefulness of such a publication. In a number of instances criticisms as to details have been received, all given in a most helpful spirit and the majority being of a most useful character. Among these comments are the following, which I reproduce in a very condensed form: (1) several suggestions have been made as to an uniform order in which the diseases should be published in the tables and the text; (2) some have expressed the wish that statistics should be published in greater detail from the point of view of the administrative divisions of the different countries, such as states and provinces, especially for those countries of large area and population; (3) while opinion was somewhat divided on the question of expressing the data in terms of rates, there seemed to be a general desire that the population should at any rate be shown for each country, and each subdivision thereof, for which statistics are published, in order that the reader could, if desired, compute relative figures; (4) some of the comments emphasised that, when populations are shown, it should be stated as far as possible how the figures were arrived at, that is, whether taken from the latest census reports, or estimated, and if the latter, how the estimate was made; (I may state that figures of populations have been given whenever available, and as regards the methods of estimating intercensal population, the latest data on population are being collected) (5) there seems to be a general desire for the inclusion of all the current mortality reports available; (6) in respect of mortality reports for cities, considerable emphasis has been placed by some on the necessity for distinguishing between resident and non-resident deaths; (7) the publication of mortality figures by causes from cities weekly does not seem to be regarded as important except in the case of an epidemic, and the opinion has been expressed that figures for months of for periods of four weeks would be sufficient; (8) a general desire was expressed for the greatest possible promptness in the exchange of intelligence, as it was felt that the greater this promptness, the higher would be the value of these reports in practical use; (9) some commentators desire that the list of diseases for which mortality and morbidity figures are available should be extended to comprise the entire list of notifiable diseases in each country, including tuberculosis and venereal diseases. It was urged, in support of this recommendation, that the current information furnished should not be restricted to a few diseases of epidemic nature but be extended to all diseases, in view of the general interest attaching to the publication of such statistics; (10) in this connection it was also suggested that even, if no cases of a notifiable disease were reported in a country, the very fact of freedom from this disease was noteworthy; (11) a suggestion was also made that information should be given whether diseases on which reports are supplied are or are not notifiable under the laws of the country concerned; (12) notwithstanding general recognition of the fact that morbidity statistics are not comparable, it was urged by some that greater emphasis should be laid on the summaries according to diseases. It was stated that these summaries afford to the reader a means of obtaining a conception of current prevalence which he could only otherwise arrive at by laboriously compiling figures from different countries.

So far as practicable, suggestions regarding change in the content and form of the *Monthly Epidemiological Report* have been followed, and it is hoped to effect by degrees certain other improvements put forward. The general, as well as the practical, usefulness of this publication has been recognised without exception.

It is unnecessary to refer in detail to the contents of the *Monthly Epidemiological Report* for members of the Committee have had the opportunity of seeing it regularly. If I may be permitted to make the observation, I would like to point out that the chief purpose of this publication is to enable the public health services, the epidemiologist and others interested, to obtain currently a broad general view of the course of the more important notifiable diseases in countries other than their own. It is hardly necessary to state that the publication is not intended to serve as

a basis for local administrative measures, such as port or other quarantine measures. It is realised that the statistics presented possess, at the present time, little uniformity and are seriously incomplete. Reports available on the occurrence of smallpox or even plague do not afford a complete picture of the distribution of these diseases throughout the world. But there is no better way, I believe, to lay the foundation for comparability and completeness than to put the available statistics and information to such use as they properly can be put, because in this manner not only are their deficiencies fully revealed but their possibilities for greater usefulness are more clearly seen. I am glad to report that information has reached us from several public health services that they have found the intelligence published in the Epidemiological Reports, particularly as regards neighbouring countries, of a real practical value in their work. I think I am not going too far in saying that, judging from the comments that have so far been made, the statistics as compiled have already been of use to the epidemiologist who is interested in observing the chronological behaviour of diseases in different countries; that their regular publication in convenient form is helping to emphasise the value of an exchange of epidemiological information and has already stimulated some public health services to collect similar information within their own countries for their own as well as for international use, and that such a publication will serve, to an increasing degree, to focus the attention of the public health agencies of the world upon those problems which the statistics continually portray.

Although I am fully aware of the incompleteness of the information obtained and the imperfections in ito compilation, and while wishing to emphasise the experimental nature of the work at the present time, I beg to recommend that the publication of the *Monthly Epidemiological Report* should be continued and that everything possible should be done for ito development in the future.

(2) *Annual Summaries on Notifiable Diseases.* — As the members of the Committee are aware, certain portions (including the basis tables, charts and sample chapters on specific diseases) of an annual summary of the current reports on notifiable diseases in Europe in 1922 were laid before the Provisional Health Committee in proof form. This publication was similar to previous semi-annual publications dealing chiefly with epidemic diseases in Central and Eastern Europe, but, because it included all European countries for which current reports were available and employed a somewhat different method of presentation, it was thought proper to obtain the Committee's approval before proceeding to issue it. With slight modification, the publication was approved and later issued as "Epidemiological Intelligence" No. 7, under the title of *Statistics of Notifiable Diseases in Europe in 1922.* A copy of the publication, together with two diagrams showing the notification of scarlet fever and diphtheria in the European countries, was sent to the public health service in each of the countries of Europe. A request was made at the same time for criticisms and suggestions, both as to the general utility of the publication and as to its form and contents. Copies were also sent to the public health services of extra-European countries with a similar request, in view of the suggestion that the future summaries might include all countries for which data would be available.

The replies to this request, although containing a number of extremely valuable suggestions, were not as critical as I had hoped for; they have, however, indicated that an annual summarisation of the current information furnished by the various public health services is of sufficient use to warrant its extension to extra-European countries as rapidly as may be feasible. I may say that all of the current reports for 1923 have been, up to date, compiled into basic tables similar to those published in the annex to the volume for 1922; in addition, requests have been made for data for previous years as well as for certain details where the 1923 data appeared to warrant elaboration. These tables for each country will be sent, so far as they are complete, to the countries concerned with the further request that the figures be examined and, when necessary, corrected and be supplemented by such comments as the public health service may desire to make. It is expected that in April 1924 it will be possible to issue a supplement to the *Epidemiological Reports*, which will contain the following information, so far as it is available, or every country and colony from which the annual information is received:

1. A series of tables by countries or colonies showing for each:

   (*a*) The number of cases of notifiable diseases reported by weeks, ten-day periods, fortnights, or months, as the case may be, during 1923. The mortality figures of the same diseases will be shown whenever available, in the same manner.

   (*b*) The totals for the same diseases of cases (and deaths, when possible) for 1923, the final figures to be used instead of summations of current reports whenever available.

   (*c*) Similar totals for the previous five years whenever such totals are available.

2. A series of brief comments on each of the principal diseases which will include:

   (*a*) Tables for specific countries, when the tables appear to be of sufficient importance, showing the distribution of cases (and deaths) according to administration divisions, or for localities particularly affected, by season or other detail when possible.

(*b*) Comparisons of indicated incidence rates will be made, of course, when such rates will be the best means of indicating the contrast in prevalence of a disease and where such contrasts are clearly indicated and significant. It is unnecessary to say that the utmost caution will be emphasised against drawing conclusions from uncomparable data.

(*c*) Comment of a nature to invite attention merely to the outstanding features of the prevalence of the disease.

In other words, the annual summary is merely a publication similar to the monthly summary. It is not intended to be, and is not, a scientific epidemiological analysis of the data, but merely a summarisation of the data themselves, made as promptly as possible, with brief comments which will be of value to those who are interested in the available current information on disease prevalence in most countries of the world. It is hardly necessary to add that in the forthcoming publication for 1923, the valuable suggestions as to form and content received from various sources will be carried into effect wherever it is possible to do so. Again, I wish to point out that each one of these publications is an experiment with the data available. From month to month and from year to year it may be hoped that not only will the material from the different countries be available in greater detail and comparability but that the form and manner of its presentation can be improved.

2. Special Epidemiological Studies.

Special epidemiological studies were not, of course, undertaken until there was an opportunity of becoming acquainted with the work of statisticians and epidemiologists in the different countries, until information had been collected on the availability of data, and until due consideration could be given to the question of what field of study would be most useful from an international point of view. It is recognised, of course, that the impossibility of comparing data constitutes a serious obstacle to studies of this kind, but it is realised also that this obstacle must be faced for a long time to come. It should not be permitted to postpone the use of existing data for purposes which they can be legitimately made to serve. Moreover, the scientific study of any phase of the epidemiology of a given disease, from an international point of view, will in itself contribute not a little to an intimate understanding of the comparability of the morbidity and mortality data themselves.

After a good deal of careful consideration of the material, and after conferring with colleagues in other countries, I would propose, in accordance with item (*e*) of the programme of work for the service adopted by the Provisional Health Committee, that during the present year a study be begun on the periodicity of an epidemic disease. This, it seems to me, is practicable, because the chronological use of morbidity and mortality records is probably more justifiable, from the point of view of comparability, than any other use. In the prosecution of this study it will be necessary to bring together a good deal of the statistical as well as the other published records in the several countries, and this collection of material will undoubtedly be useful for other purposes. Furthermore, for an analysis of statistical records for the purpose of studying the periodicity of epidemics, it will be necessary to secure the collaboration of statistical offices in developing methods involving the use of various kinds of time series; the co-operative work on the part of these collaborating offices will be of great value in other lines of work. Finally, the study of the periodicity of epidemic disease is one which can be carried on only to a limited extent at the present time within a single country, for the reason that adequate records are not always available for other countries and, when they are, a full undertsanding of their significance is difficult except by those who are actually responsible for their collection and who are familiar with their history.

The particular disease which I have in mind is influenza. Since it appears that we have about reached the end of a great epidemic epoque of this disease, it would seem not only timely, but also important, for us to take stock of the information which has accumulated in the different countries. The periodicity of influenza — and, of course, the statistical manifestations of influenza as classified under other diseases, such as pneumonia, bronchitis, etc. — has been studied to a large extent in England and the United States. I may say that in the Statistical Office of the United States Public Health Service, of which I have charge, the work has been done on these lines for the past two or three years, and, while we feel that we have obtained some very interesting results, these would be of much more value if they could be compared with the results obtained in other countries. In view of the fact that the recent manifestation of this disease was a pandemic one, it lends itself peculiarly to a study from an international point of view.

It is intended to carry out this inquiry on the following lines : (1) to confer with the epidemiological statisticians who are working on the problem in other countries; (2) to survey the literature which has been published on this phase of the disease, together with the clinical or other collateral material that might throw light on the identity of the disease in past years; (3) to arrange for work to be done on the statistical technique necessary for the analysis of the statistical records in selected statistical offices or bureaux, with the purpose of establishing, if possible, methods to be agreed upon by the various statisticians as adequate for obtaining the desired results; (4) to arrange for the necessary mathematical work to be done in certain statistical

offices; (5) to prepare a report, in collaboration with the other statisticians engaged in this field of work, which would be submitted to the Health Committee. This work would necessarily require considerable time, and the collection of material, as well as the arrangements for the prosecution of the work, would naturally fit in with the other activities of the service.

II. — REPORTS ON HEALTH ORGANISATION AND CURRENT ACTIVITIES IN THE VARIOUS COUNTRIES.

The Medical Director has already referred in some detail to the reports on the health organisation and administration in the various countries and to the two reports which will be sent to members of the Committee. It will be recalled that when this matter was brought to the attention of the Provisional Health Committee, it was considered necessary that the health organisation and the public health services should be in possession of a systematic collection of information on the health organisation in each country.

The reports for the following thirteen countries have been completed:

Albania, Austria, Belgium, Czechoslovakia, Denmark, Finland, Germany, Hungary, Italy, Netherlands, Norway, Spain, Sweden.

For the following six countries the reports are in preparation:

France, Poland, Portugal, Roumania, Kingdom of the Serbs, Croats and Slovenes, and Switzerland.

Arrangements are under way for similar reports to be undertaken in other countries.

It is unnecessary to go into a detailed description of these reports as the two reports which will shortly be in your hands indicate their contents and their character.

I may remark that these reports have already been of great assistance to the staff at Geneva, and that their publication will undoubtedly be of value to other public health services. Various requests for detailed information as to the health organisation and administration in the different countries have been received from public health services, and without these reports in a convenient form it would be impossible to accede to these requests.

In connection with the information on the health organisation and administration of the different countries, it may be stated that arrangements are being made to develop a system of *liaison* between the public health services and the Health Organisation, whereby the Health Section is enabled to place at the disposal of the Health Committee information bearing on the various health activities in the several countries. This is being done not only through the representatives of the various public health services who happen at the time to be on the staff of the Health Section, but also by means of correspondence with medical officers who are being selected and designated for the purpose by the public health services in a number of countries. This, it will be recalled, is in line with suggestions made at one of the sessions of the Provisional Health Committee, and it was believed that the time had come for organising this phase of the intelligence work.

III. — THE STUDY OF OFFICIAL VITAL STATISTICS AND STATISTICAL PROCEDURE.

In my memorandum to the Provisional Health Committee, on the preliminary work of the service after inviting attention to the "broad distinction between epidemiological reports and other intelligence for current purposes and medical statistics for scientific use in epidemiological analyses and researches", it was pointed out that:

> "The differences between countries in the method of registering deaths and births, in diagnosing diseases causing death, in classifying those causes, etc., are so great and the variations in accuracy and completeness so wide, that no scientific use of the statistics can be made without a thorough understanding of these differences and shortcomings. It seems to me essential that a careful study should be made of the medical statistics in each country by competent medical statisticians. Some material relating to the procedure and methods of mortality and birth registration will be afforded in the preliminary reports on public health statistics; but the study of medical statistics will take considerable time and will need the best judgment of qualified statistical experts."

Reference was also made (*a*) to special reports on the organisation and procedure of vital statistics in a number of European countries, which were being prepared in the several countries, and (*b*) to the preliminary studies on the vital statistics of two countries. The special reports have been completed for thirteen countries, partially completed for six more, and arrangements are being made for similar reports for other countries. These reports have been supplemented by

enquiries made by members of the staff at Geneva and by participants in the collective statistical study to which reference later will be made. The information secured covers the following points for each country:

1. Legislation and procedure as regards:

(*a*) Registration of population (including census), births, deaths, still-births.

(*b*) Certification of causes of death.

(*c*) Notification of diseases.

2. Procedure in the compilation and tabulation of the data referred to above.

3. Official statistics, showing the distinction made as to sex, age, race (and nationality), civil condition, occupation, etc., of population, natality, mortality, and morbidity.

The information thus collected has been of great value in three ways: (1) to the staff at Geneva in the use of the statistics of the countries concerned; (2) to the participants in the collective study, to which reference later will be made; and (3) in certain preliminary studies on the comparability of the statistics of the various countries, to which more detailed reference will also be made later.

It has seemed feasible, however, that more definite and more extended uses could be made of the information which has been referred to above. It was felt that the information on the statistical organisation and procedure and on the official vital statistics in each country should be rendered available for the use of public health services and statisticians generally, and that it could also serve as the beginning of a series of studies on the comparability of certain statistics in the different countries, which would ultimately be used as the basis for recommendation and action looking toward a greater uniformity. It was proposed, therefore, that (1) a series of handbooks or *dossiers* should be prepared on the official vital statistics of each country separately, and (2) that the material so far collected, and as it is collected, should be placed at the disposal of groups of statisticians who would work with and advise the staff of the Health Section on further studies on questions of comparability. I have therefore to discuss briefly these two phases of the work and to submit certain recommendations.

1. Handbooks on the Official Vital Statistics.

As I stated in my memorandum to the Provisional Health Committee last May, the work of preparing preliminary drafts of such a handbook for two countries was entrusted to Dr. Major Greenwood. Dr. Greenwood was given an assistant and prepared preliminary drafts on the vital statistics of the *Netherlands*, *Spain* and *Portugal*. These drafts were then submitted to the Health Section at Geneva.

After some consideration it was decided that the handbooks should cover a somewhat wider field than that originally planned. It was felt that these handbooks would be of greater value if, in addition to this valuable material which Dr. Greenwood presented, information were included also on the statistical procedure and organisation, dealing somewhat in detail with the laws governing registration of population, births, deaths and notification of diseases, the procedure in transmission of reports and in the tabulation of the data, as well as the final statistics themselves.

Several of these handbooks are under way, and I beg to submit for your consideration in proof form a copy of the handbook on the Netherlands. It is hoped that about two of these handbooks can be issued every six months, and it is planned to issue the next two on Great Britain and Belgium. The handbook on the Netherlands statistics was, of course, submitted to the Public Heath Service and statistical authorities at The Hague, and in every instance the handbooks will be approved before publication by the Public Health Services and the Statistical Departments concerned.

I need not enter into a detailed description or discussion of the handbook, as its contents and its character are best indicated by the copy which is submitted with this report for your consideration. Arrangements have been effected whereby Dr. Greenwood will continue to collaborate with the Service in the preparation of these handbooks.

2. Studies on the Comparability of Statistics.

The question of the best procedure in making a study of the statistics of different countries from the point of view of comparability, with the ultimate aim of suggesting how a greater degree of uniformity can be brought about, has been given a special consideration during the past eight months. In this, the Service has had the counsel of a number of statisticians in the different countries who have not hesitated to assist in a technical capacity and to whom I wish to express cordial thanks on behalf of myself and my colleagues on the Service staff.

It is unnecessary to recall in detail that the lack of comparability has long been recognised by all statisticians and epidemiologists who have attempted to make a scientific use of the statistics in studies involving the data from more than one nation. The great work initiated by Bertillon more than 30 years ago, on an international classification of the causes of death, is familiar to us all. This international classification, in the making and revisions of which the representatives of many nations have participated, undoubtedly has been of tremendous value not only in setting up a standard of uniformity in classification, but also in giving an impetus to the movement for greater comparability of the statistics of mortality. The important part played by the French Government in this work, by the International Institute of Statistics, by the League of Red Cross Societies, and by the representatives of certain nations, is well known to us all.

It was doubtless fully realised by those who participated in drawing up and in revising the International List of the Causes of Death that they were attacking only one phase of the problem of comparability of mortality statistics, and it has been increasingly evident to those who have given the subject careful study that a uniform standard for classifying the available facts cannot in itself remedy such fundamental defects as may exist in the uniformity and comparability of the facts themselves. Even though every country or a group of countries should utilise the same method of classifying and grouping causes of death, the comparability of the data so classified is still open to question. I wish to put forward as a fundamental proposition that, before any real progress towards comparability of mortality statistics can be attained, a careful study must be made of the mortality facts as recorded in each country, the procedure by which they are classified, compiled and presented in the official statistics, and of the various factors and conditions which are responsible for the differences in their meaning. It seems to me that we have reached a stage when this necessity must be fully recognised, and that, regardless of the difficulties which may present themselves, the task must be faced and boldly attacked in an organised and systematic manner.

As I have already mentioned, a considerable amount of original material relating to this question has been collected by the Service, in addition to the literature on the subject. Preliminary statements have been prepared on some of the more important factors which are involved in the differences in the vital statistics in several countries, and will be available for the members of the Committee should they desire to refer to them. These statements were prepared by members of the Service's staff, with the assistance of several statisticians who were invited to consult with the staff in a personal and technical capacity, and after discussion of the points involved by the participants in the first collective study. It may be noted that the statements do not contain any proposals for action, but merely indicate some of the important respects in which statistics of different countries are not comparable and some of the reasons for their lack of comparability.

I beg to submit the following recommendation for your consideration:

"That special committees of technical statisticians be appointed to advise and collaborate in the study of the following subjects:

"(1) On statements of the causes of death in the different countries, and on the procedure in classification of deaths in the different countries;

"(2) On uniformity in statistical presentation of mortality, with special reference to the sex and age groups in tables of mortality from all causes, as well as for specific causes;

"(3) On the definition of still-briths;

"(4) On a standard population for use in the standardisation of mortality rates;

"(5) On notification of disease for statistical purposes and morbidity statistics."

A preliminary report would be presented to each of their special committees containing such information as is now at hand, together with an outline for a further collection of material and for its study and final presentation. When any committee feels that it would be ready to make recommendations of a definite kind, either of a preliminary or final character, on certain points, it would consider the material it had compiled and analysed and draw up its suggestions, which would be placed before the Health Committee for further action.

I may be permitted to make the following further observations:

1. That the method of having these questions considered by committees of technical statisticians is in accord with the general recommendation which was made to the Provisional Health Committee in May 1923 on the principle of co-operative effort among the statistical offices and the official statisticians. It seems to me to be an essential principle that this work should as far as possible be carried on in a co-operative way by the men who are best qualified, in a technical sense, to undertake it, and that their work should be co-ordinated and assisted by the technical staff of the service at Geneva.

2. That not one, but several, committees should be appointed, for two reasons:

(*a*) A large committee to consider the whole question would be too unwieldy and might lack that degree of concentration on specific problems which is so desirable.

(*b*) Each point should be considered separately as far as possible by a group of men who are best qualified to consider the specific subject involved.

3. It is the province of the Health Committee, to make such proposals as it may see fit after it receives the final conclusions of the committees, and to decide whether or not these partial recommendations should be included in one general proposal.

As regards some of the subjects mentioned, a considerable time must elapse before the final results of the study can be placed before the Health Committee; as regards, others, it is believed that probably the results will be available within the present year.

IV. COLLECTIVE STUDIES ON VITAL AND PUBLIC HEALTH STATISTICS.

It will be recalled that the Provisional Health Committee, in its resolution concerning the use of the additional grant by the International Health Board of $10,500 for 1923 and $21,000 for 1924, for the work of the Service of Epidemiological Intelligence and Public Health Statistics, outlined a general scheme for the extension of this work in the following terms:

(*a*) bringing medical statisticians into closer relations with each other and with the Service of Epidemiological Intelligence and Public Health Statistics; and

(*b*) affording a means by which various important differences between countries with respect to vital statistics and epidemiological records can be studied and a greater uniformity secured.

Since the project was in many respects an entirely new one, it was realised that any plans for its operation should be regarded as experimental at first, and should fit in as closely as possible with other phases of the work of the Service, in particular, and of the Health Section in general.

With the concurrence of the Chairman of the Committee, the following general plan was considered:

1. To institute a series of "interchanges" or group conferences at Geneva, and possibly at one or two other convenient points, in which vital statisticians and epidemiologists occupying administrative positions in their respective governments would participate for periods of three to two months.
2. To hold a series of conferences with medical statisticians in connection with certain phases of the work of the Service of Epidemiological Intelligence and Public Health Statistics, and on the study of specific statistical procedures in which uniformity and comparability are most important.
3. To provide the opportunity for a limited number of officers to be selected by the various governments from their public health services — to study the application of statistical methods and practices at selected institutions and public record offices.

In accordance with this plan, a group of statisticians and epidemiologists gathered for a collective study of vital statistics in Geneva begininng in the first part of October, and continuing until the middle of December 1923.

Upon the invitation of the Medical Director, participants were appointed by the public health services and statistical offices of the following countries: Brazil, Bulgaria, Czechoslovakia, Hungary, the Kingdom of the Serbs, Croats and Slovenes, Norway, Poland and Russia. In addition, Dr. Pantaleoni, of Italy, former Epidemic Commissioner, took part in the conference, as well as members of the staff of the Service.

The work of this group was divided into three general parts: first, a collective study of vital statistics at Geneva, covering a period of about six weeks. Second, visits to the statistical and epidemiological offices in Switzerland (Interlaken and Berne), Paris, The Hague and London, covering a period of about one month; and third, a series of final conferences in Geneva, lasting about ten days.

The visits of this group to the various offices in the countries mentioned above were particularly interesting and helpful, and the directors of the public health services and statistical offices concerned took the greatest trouble in arranging instructive programmes.

In general, the work of this group at Geneva covered the following subjects:

1. Registration of deaths, with particular reference to the procedure and factors governing the completeness and accuracy of statements of causes of death.

2. Mortality statistics, with a study of the various methods of census enumeration, population registration and details of population statistics from the point of view of their use in vital statistics.
3. Methods of making inter-censal estimates of population.
4. Standardisation of rates and methods of adjusting death rates to standard population.
5. Registration of births, with particular reference to definition of still-births.
6. Statistics of births and of infantile mortality.
7. Statistics of disease prevalence and epidemiological intelligence.

On each of these subjects the general procedure was (1) to consider the material which had been collected from various sources by the staff of the Service; (2) for each participant to present to the group a statement of the procedure and statistics in his own country; (3) to discuss the differences existing in these procedures as well as in such others as were known in detail, with the object of discussing the comparability of the data themselves, the statistics and the various conditions and factors producing lack of uniformity; (4) for the participants to assist in preparing preliminary reports on each of these subjects, to be used at further group conferences and special committees.

During the stay in Geneva, daily conferences, sometimes extending to two meetings, were held; in addition, it was found possible to secure the presence of several statisticians and public health officers who gave lectures to the group on specific subjects.

A detailed report on the proceedings of the work of this collective study has been prepared and will be placed before the Committee, if desired, when the question comes up for discussion. The following is a brief statement of the programme which was followed in the course of the visits of the group to Interlaken, Berne, Paris, The Hague and London.

1. Switzerland.

November 20th. At *Interlaken* a visit was paid to the Swiss Census Bureau. An account of the methods of census-taking, the organisation of the bureau and the mechanical and other equipment for tabulating results was given by Dr. Marcel Ney, director of the bureau, and his assistant, Dr. Schwarz. A demonstration was made of the use of modern tabulating machines in the analysis of census data.

November 21st. In the morning, the Federal Statistical Bureau at *Berne* was visited, and Dr. Ney explained the organisation and procedure for tabulating and analysing vital statistics for Switzerland, with special reference to the system by which data relating to causes of death were certified and transmitted to the Federal Statistical Bureau and the influence thereby produced on the reliability of physicians' statements of the causes of death.

In the afternoon an account was given by Dr. H. Carrière, Director of the Federal Health Department, of the notification of clinical diseases and of the methods by which the morbidity and mortality statistics of the country were collected and prepared for publication in the *Weekly Bulletin*.

2. France.

November 23rd. At *Paris* a visit was paid to the Bureau de la Statistique Générale de la France, where the participants were received by M. Michel Huber, Director, and by M. Henri Bunle, an Assistant Director. An exposé was made by M. Huber on the methods of census-taking in France.

November 24th. An account was given by M. Bunle on the methods of collecting and tabulating the statistics of population, births, deaths, marriage and divorce, etc. This was followed by a tour through the offices, where demonstrations were given of the use of the "classi-compteur", an invention of M. Lucien Marche, former Director of the Bureau.

November 26th. In the morning the participants were received at the Mairie of the VIIIth Arrondissement of Paris by the Mayor, Dr. Maréchal. The object of this visit was to examine the actual methods of birth, death and marriage registration in the Bureau de l'Etat civil. A practical demonstration was made and a discussion followed concerning registration methods.

In the afternoon the participants visited the Bureau de la Statistique municipale, where M. Lambert, the Director, described the work of the Bureau. A practical demonstration was given by M. Richard of the use of modern tabulating machines in vital statistical work.

3. The Netherlands.

November 28th. In the morning the participants were received by M. H. W. Methorst, Director, at the Central Statistical Bureau of the Netherlands at *The Hague*. They were shown the actual organisation and equipment of this Bureau, which is housed in a specially constructed building. An account was given by M. Methorst of the organisation and the system of population registers now kept in the Netherlands.

Dr. Terburgh, Chief Inspector of the National Health Department, explained the notification of diseases in the Netherlands and the organisation and nature of morbidity statistics.

In the afternoon General Quanjer gave an account of the system of birth, death and marriage registration, which was followed by a visit to the Bureau de l'Etat civil, where the population registers and registration of births and deaths were explained in detail, with practical demonstrations.

November 29th. General Quanjer explained the health organisation of the Dutch army and navy. M. Fonck gave a detailed description of the method of population enumeration in the Netherlands. A tour through the work-rooms followed, where the methods of preparing statistics of population, births, deaths, marriages, army and navy morbidity and mortality were demonstrated.

4 ENGLAND.

December 3rd. In the morning the participants were received at the Ministry of Health, *London*, by Sir George Buchanan, Senior Medical Officer, who explained the organisation of the Ministry of Health and its relation to the local and colonial departments of health.

In the afternoon Dr. Reginald Dudfield, Medical Officer of the Borough of Paddington, described the use of morbidity and mortality statistics in public health work, the object of the visit being to enable the participants to see how public health statistics were collected and utilised in a local health office.

December 4th. In the morning the office of the local registrar of births and deaths of Finsbury was visited. The Registrar, Mr. Comfort, explained in detail the registration processes and the methods of making returns to the General Registrar's Office of the United Kingdom.

In the afternoon the Registrar-General received the group at Somerset House, and the Assistant Registrar-General, Mr. de Jastrzebski, explained the technical organisation and the work done in the office.

December 5th. In the morning a lecture was given by Dr. T. H. C. Stevenson on the analysis of mortality returns, in which several important points were discussed.

In the afternoon the group was received at the Medical Research Institute, *Hampstead*, by Sir Walter Fletcher, Secretary of the Medical Research Council, and three important papers were read: by Dr. John Brownlee on the periodicity of epidemics of measles; by Dr. Major Greenwood on the international study of cancer statistics; and by Miss E. M. Newbold on the statistical study of industrial accidents.

Dr. Brownlee showed the group the collection of mathematical and statistical apparati in the Institute, and Dr. Leonard Hill, Director of the Department of Applied Physiology, demonstrated methods of experimental study in relation to physical conditions of light and air in dwelling- and work-rooms. The statistical work of the Institute and its relation to the Ministry of Health and to the Industrial Health Statistics Committee were explained.

December 6th. A description of census methods was given at the Registrar's General Office by members of the staff.

December 7th. A final conference was held at this Office, Mr. Vivian, the Registrar-General, discussing with members of the party various phases of the work of the Office, and a general explanation of various points followed.

In the afternoon a final visit was made to the Ministry of Health, where Colonel S. P. James, Chief of the Medical Intelligence Service, explained the work of his Service.

I think I can say without reservation that this Conference was extraordinarily helpful to the work of the Service, particularly in the following respects:

(*a*) The participants rendered great assistance by furnishing information on the vital statistics and epidemiological data of their own countries, which could not be wholly available otherwise;

(*b*) Their participation in the consideration of the differences in vital statistics and epidemiological data in various countries was extremely helpful in the preparation of preliminary reports on these subjects;

(*c*) The Conference brought the participants into close touch with one another and with the Health Section, and the opportunity afforded them of intimate acquaintance with the Epidemiological Intelligence and Vital Statistical work of the Service enabled them to make many very useful suggestions.

Without exception, the participants expressed themselves as having greatly benefited by their stay in Geneva and by the opportunity to study the organisations and procedures adopted in the various countries which they visited.

It is proposed during the present year to have two collective studies of this kind. From experience gained in the first one, certain improvements will be made in the programme. It was felt that a smaller group of participants, not exceeding six in number, would be preferable

to a large group, and that, for reasons of convenience, it would be better that members of each group should represent contiguous countries. It is realised that visits by two groups of participants would throw somewhat of a burden on the statistical offices and public health services, and it is not proposed that the two groups should visit the same countries.

As regards the second item on the programme, special statisticians have been invited to come to Geneva for conferences with members of the staff on the study of vital statistics of various countries and on their comparability. These statisticians were invited in their personal capacity as technical experts, and the conferences were purely informal. Up to date (January 11th) the following have visited Geneva:

Professor Alfredo NICEFORO, of the University of Naples, Italy;

Dr. E. ROESLE, Reichsgesundheitsamt, Germany;

Dr. Marcel NEY, Director of Federal Statistical Bureau, Switzerland.

In addition, it is hoped that, before the Health Committee meets, it will have been possible also for M. METHORST, Director of the Central Statistical Bureau, Holland; M. HUBER, Director of the General Statistical Bureau of France; and Dr. ROSENFELD, Health Statistics Section, Ministry for Social Administration, Austria, to visit Geneva and give their advice on certain technical phases of the work. Arrangements are being made for further conferences, to take place as occasion arises. In conformity with the proposal mentioned earlier in the report, namely, that sub-committees of technical statisticians should advise and assist in the study of certain specific questions regarding vital statistics, it will be possible to carry on this phase of the work.

(Signed) EDGAR SYDENSTRICKER.

C. H. E. P. S. 46.

Annex 6.

GENERAL SCHEME OF INTERCHANGES OF PUBLIC HEALTH PERSONNEL.

Report of the Sub-Committee, adopted by the Committee on February 14th, 1924.

1. *Candidates.*

(*a*) The following categories may be taken into consideration:

(i) *Junior medical officers* preparing for important work. Their needs or requests, as regards opportunities of instruction in foreign countries, will be dealt with by the International Health Board of the Rockefeller Foundation, and thus do not come within the sphere of action of the Health Organisation of the League of Nations.

(ii) *Public health officers* occupying responsible posts, from the rank of urban or rural district medical officers up to that of principal medical officers, medical officers and sanitary advisers in central or local public health administrative departments. It is for these candidates that the interchanges of the Health Organisation of the League of Nations are particularly intended.

(iii) *Engineers and architects and senior sanitary officers in the service of public health departments.*

(*b*) *Selection.* This is a very important matter. In each country, lists should be prepared:

(i) Of posts the importance of which, for public health, renders the occupants thereof particularly suitable as candidates for the interchanges.

(ii) Of *officials* occupying such posts who may be considered eligible as candidates for general or special interchanges, or for individual missions, according to the requirements of the public health administration of the country on the one hand and to the qualifications of the official concerned on the other.

2. *Organisation of the Interchanges.*

(*a*) *General and special interchanges should comprise:*

(i) A preliminary period during which information will be given to the visitors on the public health organisation and institutions of the country, some of which will be visited.

(ii) A period during which the visiting officers will be attached to the public health departments in groups of not more than three or four.

(iii) A period to be devoted to final demonstrations and an exchange of views which will include opportunities of full discussion between the visitors and the organisers in the country visited, to ascertain the questions on which the information already gained should be supplemented.

(iv) Final visit to Geneva.

This general scheme should be followed in small as well as in large countries.

(*b*) *Individual missions* (for research and study).

(i) The *candidates* should be officers of experience capable of making reports of definite value.

(ii) The *subjects to be studied* should be of interest not only to the official himself and the administration to which he belongs but also to the International Health Organisation and should be valuable in connection with international questions relating to the protection of public health.

(*c*) *Collective studies in one or several countries.*

These studies should be limited to subjects of wide interest, such as malaria. For this purpose several qualified experts may be nominated to study the subject determined upon, at certain prescribed places. On the termination of their studies the experts should make a joint report.

3. *Duration of the Interchange.*

From the experience gained by previous interchanges, a period of from six to twelve weeks appears generally to be necessary.

4. *Publications in connection with Interchanges.*

These may include the following:

(i) *Documentation to be sent beforehand* to persons taking part in interchanges. This will be prepared by the country to which the officers taking part are proceeding and will contain full information on the subjects to be dealt with.

(ii) *Reports* prepared by the visitors on the results of their studies abroad. It is desirable that these reports should preferably not be published by the authors without the consent of the health administration to which they belong. In exceptional cases such reports may be published by the Health Section, if thought desirable, but only subject to the approval of the authors' official superiors, and after consultation with the health authorities of the country in question.

(iii) *Joint reports.* These will contain the information obtained during the mission. The observations in the previous paragraph with regard to publication will be equally applicable to these reports.

PROGRAMMES AT PRESENT UNDER CONSIDERATION.

(*a*) 1924. (In addition to those already organised):

(i) A visiting tour of *malaria* specialists would appear necessary and desirable, in view of the great interest which has been aroused in this disease. These collective studies might take place in Italy, the Kingdom of the Serbs, Croats and Slovenes, Russia and perhaps the French possessions in Northern Africa.

(ii) An interchange for a short period and of a restricted number of persons should be organised for the coming autumn in the *Far East.*

(iii) A programme of *individual missions* and *joint enquiries* should be considered on the merits of individual proposals.

(iv) In order to enable the Committee to reach a decision in due course, consideration should be given to the question of organising group interchanges of medical inspectors of factories, etc., who belong to central or provincial administrative bodies, or to municipal health departments, and who have specialised in industrial health and pathology, as well as of Medical Officers of Health of large urban areas.

(*b*) 1925.

It is provisionally proposed to organise the Interchange visits in the following countries in 1925:

General	Great Britain, Belgium, Kingdom of the Serbs, Croats and Slovenes, Japan
For specialists	Sweden, Russia France, etc.

in which countries it is suggested that the subject for specialist study should be "Maternity and child welfare problems, and measures to reduce infant mortality".

Annex 7. C. H. 152.

INTERIM REPORT ON THE INVESTIGATIONS ARISING OUT OF THE INTERNATIONAL PHARMACOLOGICAL CONFERENCE, EDINBURGH, JULY 19th-21st, 1923.

Submitted to the Health Committee on February 16th, 1924.

Action has been taken as follows on the recommendations of the International Conference:

1. Thyroid Gland.

Professor Straub has been engaged in investigating the methods of standardising preparations of the thyroid gland and has submitted an Interim Report on his work with two different methods, giving promise of improvement of the methods already available.

Professor Reid Hunt has undertaken to explore the possibilities of a combined laboratory and clinical essay of thyroid preparations in the United States.

2. Ergot.

Professor Straub is experimenting with a new method of estimating ergot for the specific alkaloids, by use of isolated muscular organs.

It is hoped that opportunity will be given later for comparing the results of this method with those obtained by the method of Broom and Clark, to which attention was drawn by the discussion of the Conference, and with which Professor Straub's proposed method has some points of similarity.

3. Pituitary (posterior lobe) Extract.

In accordance with the request of the International Conference, Professor Voegtlin has had prepared, and has placed in Dr. Dale's hands for distribution, a preliminary supply of the stable acetone dried powder recommended by the International Conference for trial as a suitable standard. Samples of this preparation have been placed in the hands of the following investigators:

Professors Magnus, Meyer, Heymans, Dixon and V. E. Henderson of Toronto.

It is hoped that trials, by these different, will lead to an early decision as to the suitability of the Washington preparation.

A report has been received from Dr. Bijlsma, working in conjunction with Professor Magnus, to the effect that he has now convinced himself, in new experiments, using the salt solution of Dale, that histamine is not, under these circumstances, a reliable standard for pituitary extract. Dr. Bijlsma will now share in the trial of the dry standard prepared at the recommendation of the Conference.

4. Digitalis.

Professor Magnus and his colleagues are engaged in the preparation of the standard dry sample of digitalis powder recommended by the Conference for trial as a standard. They have obtained two large samples of digitalis powder of unusually high and unusually low activities. It is proposed that these shall be carefully evaluated, by the different methods discussed at the Conference, in the laboratories which undertook such work, and that the same samples shall subsequently be submitted to careful clinical trials, in selected hospitals, with a view to establishing the relation existing between the values determined by the different forms of laboratory test and the true therapeutic potencies of the digitalis preparations.

Professor Magnus has now also obtained a quantity of carefully dried digitalis powder which can be regarded as having a normal activity, and which, therefore, can suitably be adopted as a

basal standard. Samples of this and of the high- and low-value powders will be distributed to the laboratories which have undertaken the biological tests, and arrangements will be made for the projected clinical trials.

Professor Straub is already engaged in experiments directed to improvement in the accuracy of estimations of the galenical preparations by the frog-method.

5. Insulin.

Material is still being collected for the proposed stable insulin standard. Supplies of suitable material have already been generously placed at the disposal of the National Institute for Medical Research by Professor Krogh, The British Drug Houses, Ltd., Messrs. Burroughs Wellcome & Company, and Messrs. Eli Lilly & Company. Further donations are in view which, with the material prepared at the National Institute and that already received, should furnish a sufficient basis for the preparation of the standard material on an adequate scale.

(Signed) Dale.

January 5th, 1924.

Annex 8.

EXTRACT FROM THE TREATY OF PEACE WITH TURKEY.

Part IV, Section II. — Sanitary Questions.

Declaration relating to Sanitary Matters.

The Undersigned, acting in virtue of their full powers, declare that the Turkish Government will appoint for a period of five years three European medical specialists as counsellors for the sanitary administration of the frontiers. These medical specialists shall be Turkish officials and shall be attached to the Ministry of Health. They shall be chosen by the said Government from a list of six names, prepared in agreement by the Health Committee of the League of Nations and by the International Bureau of Public Health. Their salary, as well as the other terms of their appointment, shall be settled by agreement between the said Government and the two above-mentioned international organisations.

The Turkish Sanitary Administration shall establish, with the help of the three above-mentioned European counsellors, regulations for the organisation of the sanitary administration of the coasts and frontiers of Turkey. These regulations shall be in accordance with the terms of the International Sanitary Conventions, and, in so far as the Straits are concerned, with the terms of the Straits Convention signed this day.

The yield of the sanitary taxes exacted by the Turkish Administration shall be exclusively applied to the needs of the Sanitary Administration of Turkey, and shall appear in a special budget, which shall be prepared for this purpose by the Ministry of Health.

Done at Lausanne the 24th July 1923.

Ismet.
Dr. Riza Nour.
Hassan.

Annex 8a. C. H. 138.

LETTER DATED OCTOBER 25th, 1923, FROM THE MINISTER FOR FOREIGN AFFAIRS OF THE ANGORA GOVERNMENT TO THE PRESIDENT OF THE HEALTH COMMITTEE

[*Translation*].

Sir,

The Turkish Government desires, upon the coming into force of the Treaty of Lausanne, and in accordance with the Declaration on Health Questions signed on July 24th, 1923, to appoint three European medical specialists as advisers to the Frontier Sanitary Service. I should therefore be

grateful if you would be good enough, in consultation with the Office international d'Hygiène publique, to draw up a list of six names, as specified in the above-mentioned Declaration.

I may inform you that a similar request has been made to the President of the Office international d'Hygiène publique.

(Signed) ISMET.

Annex 8b. C. H. 138.

LETTER DATED NOVEMBER 22nd, 1923, FROM THE PRESIDENT OF THE HEALTH COMMITTEE TO THE MINISTER FOR FOREIGN AFFAIRS OF THE ANGORA GOVERNMENT.

[*Translation*].

Your Excellency,

In your letter of October 25th, 1923, you asked me to draw up, in agreement with the International Office of Public Health, the list of six European medical specialists to be appointed in accordance with the Declaration signed at Lausanne on July 24th, 1923.

I am extremely grateful to you for having informed me that you would, at the same time, advise the President of the International Office of Public Health.

As, in conformity with the aforementioned Declaration, the Turkish Government had expressed a desire to appoint three advisers to the Frontier Sanitary Service, as from the coming into force of the Treaty of Lausanne, I at once got into touch with my colleagues on the League of Nations Health Committee and with the President of the Office international d'Hygiène, asking them if these two organisations would appoint the six candidates referred to as quickly as possible — if convenient, prior to their regular session.

I have no doubt that they will promptly comply with my request, and I will inform you of their decision as soon as I am acquainted with it.

(Signed) Th. MADSEN.

C. H. 177.

Annex 9.

CANCER INVESTIGATIONS.

Report of the Sub-Committee submitted to the Health Committee on February 16th, 1924.

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1. The origin of the inquiries on which the Cancer Sub-Committee is engaged is fully set out in the Minutes of the session of the Provisional Health Committee of June last. At that session the results of the general questionnaire on cancer data, recently made at the Office international d'Hygiène publique, were referred to (see *Bulletin* of the Office, Vol. XV, No. 6, June 1923), and it was agreed, for reasons stated indicated in the Minutes, to set up a Sub-Committee identical with that already appointed by the Office international, but with power to add experts, in order to explore the possibilities of securing a thorough and intensive inquiry into one aspect of the great problem, namely, that of explaining differences between the incidence of and mortality from cancer in different countries. The necessity of proceeding step by step in this vast field of inquiry being realised, it was decided that in the first instance this differential comparison was to be made in respect of three European countries only, Great Britain, Netherlands and Italy, and that is object should be to determine the causes of the great differences between these three countries which are shown, over a long series of years, in the mortality from two forms of cancer — cancer of the breast and uterine cancer. This limitation seemed the more desirable and practical because in the first place each of the three countries named has a well-organised service of national statistics of causes of death, and in the second place both cancer of the breast and uterine cancer are diseases which are very characteristic and for which error of diagnosis is relatively uncommon.

2. The Cancer Sub-Committee accordingly met in Paris in November 1923, and its report, report with the invaluable assistance of experts named therein, sets out the position fully. This made has already been printed and circulated to members of the Committee (Document C. H. 137 (1). 1923) and it shows the direction in which the problem is being attacked.

3. At the present date there is little to add to that report, except to inform the Health Committee of the progress which has since been made, and to invite the Committee to authorise the continuance of these inquiries as between the three countries named. The investigation already promises to be fertile in its results and thus to be helpful in the study of the great cancer problem, one of the most important public health questions affecting all nations. We feel that, by instituting detailed international comparison between countries with remarkable differences in their cancer mortality, in order to settle why these differences exist, the Committee has the opportunity of opening a new and valuable field of investigation, and one which can be most effectively undertaken through the official international health organisations — perhaps only through them.

4. Following the resolutions taken at the November meeting of the Cancer Sub-Committee, steps have been taken in each country to follow two lines of investigation determined in the report:—

a) Detailed examination of the national statistics, published and unpublished, in relation to breast and uterine cancer; and

b) The institution and recording of a series of inquiries, made on a uniform plan, into individual cases of these diseases as they present themselves at selected hospitals (clinics). In addition, there is the important question of studying the records of past cases in each country — a task which cannot well be conducted on similar lines in all the three countries, but which each country is invited to undertake to the best of its power. We have every confidence that these studies of records of past cases will in themselves aid greatly in furnishing explanations of our problem.

5. Supplementary information of a provisional nature regarding the work already accomplished, particularly on the statistical side, is at the disposal of members of the Health Committee. We may add as regards methods of enquiry that the practicability and success of the several lines of work depend greatly on the way in which the necessary assistance of officials, statisticians, medical officers, surgeons, and the patients themselves is sought, and much care has been given in each country to ascertaining by practical experience what methods must be adopted to obtain such assistance.

6. The Cancer Sub-Committee's recommendation that in each country some one investigating officer should be held responsible for the inquiries made of patients has proved to be very important — for the purposes desired, each country must be able to produce results in which it has full confidence.

7. The Sub-Committee realised that some or all of the participating countries are undertaking their own national inquiries into cancer problems, and consequently it was made clear in the Sub-Committee's report that the work desired for the international comparison, whether statistical or at hospitals, may properly be incorporated with such nationa l investigations, so as to prevent any inconvenient overlap king and so as facilitate the work. This understanding is proving of great practical advantage.

8. If the Health Committee desires that this promising work should continue, the procedure we would suggest is as follows: First, we require, at a very early date, another meeting of the Cancer Sub-Committee, to state and compare the results of the experimental inquiries so far made in our respective countries (we have already exchanged notes on progress); to adjust details of our programme, if necessary, according to that experience; and then to proceed on the two lines of investigation in our several countries for a sufficient period. A definite period, if possible not more than twelve months, should be determined on, in which we would do our best to secure that the observations result in data of sufficient magnitude and comparability to yield the full value which the projected lines of inquiry (specified in the printed report) can produce.

9. In considering the cost of these investigations, we have to allow for different circumstances in the three countries, but, in each instance, the inquiries, if they are not to be interminable in length and possibly inconclusive through errors, will call for what we may term auxiliary payments, and we would invite the Health Committee to resolve at its present session that expenditure should be incurred for this purpose from the funds at the disposal of the Health Organisation of the League. In one instance the payment required may be for the services (whole time or part time) of a competent medical investigator who visits the hospitals and clinics. In another, the payment may consist of small honoraria given at the hospitals for information specially furnished; in a third, the payment required may be for assistance to the statistician by extracting or analysing particular figures. We submit that, by means of monetary assistance of this nature, the Sub-Committee can secure for the Health Committee the participation and advice of experts of high standing, willing to put their knowledge and time freely at its disposal. Indeed, given this monetary assistance, their co-operation is already assured.

10. The experience obtained since November last, when sums representing a total of Sw. frs. 15,000 were allotted to the Cancer Sub-Committee for this work from the budget for 1923, enables us to give an approximate estimate of the amount which might have to be expended for the year's investigation indicated above. Provisionally we would place this at about Sw. frs. 72,500 for the three countries together. Allowance should also be made for the cost of necessary sessions (probably three) of the whole Sub-Committee, and for occasional meetings of hospital enquiry officers or statistical officers to clear up difficulties which arise or to verify that this work is proceeding on comparable lines.

Cancer Statistical Investigation

England.

In accordance with the resolution adopted by the Sub-Committee in November 1923, immediate steps were taken to from the records the data relating to mortality from cancer of the breast and uterus in each of the principal administrative districts during the decennium 1911-20. Statistics of deaths of women from cancer of the breast and uterus, distributed into quinquennial age-groups, have been obtained, each age-group being subdivided into unmarried, married, widowed, and unstated — a very small group. This classification was supplied for:

(*a*) All the boroughs of London;
(*b*) All the county boroughs (large provincial towns);
(*c*) The urban population of each administrative county;
(*d*) The rural population of each administrative county.

As a basis of calculation, the census results of 1911 and of 1921 have been taken.

Mean rates of mortality in age and civil state groups have been calculated for London and the county boroughs.

No further work on the relation between cancer mortality and industrial employment has yet been done. We have, however, sent to our foreign colleagues a copy of the English list of professions (census 1901) translated into French.

Up to the present, special attention has been devoted to the relation between the number of children born and the mortality from cancer of the uterus, in order to test Dr. Deelman's conclusion that the fact of having borne children rather than the number of children born was the important etiological factor. The results are not decisive, but tend to support this opinion.

The rate of mortality of widows is appreciably higher than that of married women at most ages below extreme old age.

No statistically significant correlation between the rate of mortality from cancer of the uterus in married women and any measure of regional fertility (such as the legitimate birth-rate) has been obtained. The same method of examination yields a very significant correlation between the rate of mortality from cancer of the uterus and the proportion of married women, so that the lack of correlation with fertility is of importance.

The English members propose to proceed with their statistical enquiry as follows:

The general tabulation of the data regarding cancer of the breast and the uterus will be continued as rapidly as possible.

Tables and constants showing the relations of measures of fertility and of mortality from cancer of the uterus in married women in each age-group will then be prepared.

The English members desire to submit these results with any necessary comments to a meeting of the Sub-Committee which it is hoped will be arranged early in April. At that meeting, plans for further work, including the question of industrial classification and methods of statistical analysis, might be considered. They hope that by that date all the statistical members will have been able to take a preliminary view of the material available, and they suggest that, until such an exchange of opinions has taken place, it is premature to enter upon lengthy technical analyses.

Italy.

It has been decided to limit the statistical enquiry to a period of three years. The years 1919-20-21 have been chosen, being the most recent, and because they are uncomplicated by demographic and health disturbances dependent on the Great War and the pandemic of influenza of 1918.

All calculations have been based on the census results of 1911. The results of the census of 1921 as regards profession, age and sex distribution and civil state are not available. The Italian Delegation is of the opinion that census results more remote than that of 1911 (*e.g.* 1901) would be of little value from the point of view of the present enquiry, as the evolution of the disease is not of such long duration.

Considerable progress has already been made with the statistical enquiry. Figures have been extracted from the certified causes of death for the years 1919 and 1920, and crude figures regarding fatal cases of cancer by age, sex, civil state and profession have been systematically collected.

In addition, the data have been classified according to different regions and for each region according to the localisation of the cancer, using the normal classification adopted in the Italian

classification of causes of death. It is understood that, for the purposes of the comparative enquiry, cases of cancer of the breast and uterus will be separated from the others.

This important work is rapidly progressing, thanks to the personal interest which is being taken in it by the Director-General of Statistics in Italy: M. A. Asschieri.

With regard to age, it appears desirable to subdivide the ten-year age-groups of the official statistical returns and to make five groups each of five years from the age of forty upwards — ages at which cancer most commonly occurs.

As regards civil state, cases have been divided into married women, spinsters and widows.

The enquiry regarding the influence of profession is receiving special attention. The classification of professions is not the same in the three countries. We have collected in one group persons employed in agriculture, hunting and fishing — all open-air occupations. Moreover, in the group "no occupation" a distinction has been made between well-to-do people and others without employment (invalids, prisoners, etc.), the conditions of these classes being absolutely different.

Women engaged in household duties, who constitute more than half the total female population of Italy, are considered apart. A further group has been made: "occupation not stated", as information under this heading is frequently vague.

It is not possible to undertake a more detailed comparison as the number of occupations figuring in the different censuses is too great — in 1911 there were no less than 364 — and the death returns often do not give sufficiently precise information for exact comparison.

In studying the influence of profession on the production of cancer, the Italian delegation hopes to examine the question as to whether, in respect of certain professions more exposed to conditions wheck are favorable to the disease, such as, *e.i.*, temperature, chemical, mechanical and feeding, show higher mortality figures for cancer than others which are not exposed to these special conditions. Some of these results have already been tabulated.

The Netherlands.

The Central Bureau of Statistics has furnished us with figures denoting the mortality from cancer of the breast and of the uterus for the period of 1918-1922, and the work of grouping these figures has been begun. The figures for the preceding five years have not yet been collected.

With regard to cancer of the breast, the deaths have been first of all divided into age-groups of ten years and according to civil state, *i.e.*, married women, spinsters, widows or divorcees have been grouped separately. The mortality has then been calculated per ten thousand inhabitants per year, making use of the census results of 1920-21.

A comparison of the figures for married women and spinsters respectively shows that the mortality below 40 years of age is fifty per cent higher among married women. Above forty years of age, the mortality among married women is lower than among unmarried.

With regard to widows and divorcees, this group corresponds more or less closely to that of married women. The figures differ very little, and it is suggested that from now onwards we should consider only two groups: married and unmarried, including widows in the married group.

For cancer included in the group 46 of the nomenclature of the causes of deaths, the calculation is not so simple as it is for cancer of the breast, as the cause of mortality has to be further subdivided into cancer of the uterus, cancer of the ovary and cancer of the female genital organs. On the average, 70 % of group 46 are cases of cancer of the uterus, 20 % cancer of the ovary and 10 % cancer of other organs.

We are anxious further to subdivide the last group, for which purpose we have been fortunate in obtaining the assistance of doctors. If the results indicate that there are no cases of cancer of the uterus and of the ovary in this group, it is not our intention to continue the investigation, for the remaining years and the group will be considered separately.

If the affections of the uterus and of the ovary be compared according to age and civil state, we obtain the following results: In all the age-groups below 70, cancer of the uterus is more frequent among married women than among unmarried. These differences are, in general, very appreciable, more especially below 40 years of age. Above 70 years of age, the figures are too small to justify a conclusion. It would appear, however, that the mortality rate is somewhat higher among unmarried women between 70 and 79 years of age than among married.

It is interesting to note that the difference between widows and unmarried women is greater than between married women and unmarried women. It would seem important to make an international comparison of such data.

The group containing deaths ascribed to cancer of the ovary is not a large one, but it is by no means negligible.

We have not considered cancer of the other genital organs, because we are awaiting the results of the enquiry being carried out by doctors.

We intend to divide still further the age periods into five-year groups and to tabulate the statistics for those parts of the country where mortality is lowest so as to try to discover still other differences.

The relatively large figures and the limited time which we have at our disposal are sufficient explanation of the fact that we have not made further progress. Several more months will be required to finish this portion of the work.

Hospital Enquiry.

England.

Following the decision of the Cancer Sub-Committee in November 1923, preliminary work has been undertaken to ascertain how best to secure a series of cases of cancer of the breast and uterus, from the present time onwards, which would be sufficient to allow of the various facts required being fully and carefully ascertained in the manner agreed upon, for each case of the disease, together with the corresponding facts in control cases.

In England, for example, a highly competent medical officer, Dr. Janet Lane-Claypon, has already organised and has personally carried out a system of enquiries into the history and condition of individual cases of cancer of the breast at two important "surgical units" in London — University College Hospital and St. Bartholomew's Hospital. Some of these cases were interrogated at the institutions and others at their homes. The manner in which these interrogations can be made, the measures best suited to enlist the co-operation of the hospital authorities, the time which should be allowed, and the number of cases which are likely to be secured, have all received full consideration. The suitability of the questionnaire, the form most suitable for record, and other important matters of detail have received attention, and valuable suggestions have been received from the foreign collaborators.

This work has already resulted in the full investigation of about 50 cases of cancer of the breast, while a start has been made to obtain sufficient controls. Even with this small number several useful indications have been obtained. It may be said unofficially that the way is now clear for obtaining this information on a wider scale by utilising other London hospitals and by extending the observations to about six important centres outside London, including Manchester, Birmingham and Liverpool. These observations would be undertaken locally by a competent medical officer, whose work would be controlled by Dr. Lane-Claypon, who would have the responsibility of securing for the whole of the Englishseries that uniformity of method of enquiry and record which is so indispensable. It is estimated that on this system it should be possible to obtain somewhere about 800 to 1,000 cases of cancer of the breast, with a similar or larger number of control cases in England (possibly obtaining assistance also from Scotland and Wales) if 12 months be allowed for the work. By a parallel system a similar number of cases of uterine cancer could be dealt with.

Italy.

As recommended by the Cancer Sub-Committee, the hospital enquiry should consist of: (1) A retrospective study of cases that have been treated within a certain period of time, and, (2) Observations on new cases that may be admitted into hospital.

The retrospective enquiry in Italy has been confined to the years 1919-20-21, due regard being paid to the age, civil state and occupation of the patient. This enquiry will be confined to the hospitals of the following towns: Rome, Milan, Pavia, Venice, Bologna, Naples, Catania, Florence and Cagliari. The widespread nature of this enquiry is of importance, because there are notable differences in the various areas of the country as regards the mortality from cancer; the Italian delegation attaches great importance to this investigation.

The questionnaires which the delegation has prepared are more comprehensive than those of the two other countries. Italy considers it important to collect information regarding all cases of cancer, whatever may be the organ affected, paying strict attention, however, to the aims of the special enquiry on cancer of the breast and of the uterus. The Italian delegation is confident that the enquiry will be carried out on lines strictly parallel with those in England and the Netherlands and that the results obtained as regards these two special forms of cancer will be strictly comparable in all three countries. It is with this idea that the special investigations carried out in the pathological institutes are so comprehensive; they may be able to furnish valuable information from a comparative point of view.

The hospital enquiry is in itself tedious and complicated, and has only just begun. For these reasons no definite results are available at the present time.

The delegation hopes also, for reasons which are of importance chiefly to Italy herself, to carry out a special enquiry in Emilia and Tuscany, in which provinces cancer is specially prevalent. The results of this investigation can then be brought into line with the general hospital enquiry, and it is possible that valuable information may be forthcoming regarding the pathogenesis of the disease.

Work has already been completed in connection with the bibliography relating to malignant tumours. The delegation draws attention to the considerable importance of the literary contributions of the Italian school on all aspects of the cancer problem, its etiology, histology, pathology, etc.

Future enquiries will yield without doubt far more important results, because it will be possible to undertake them on the lines specially laid down by the Sub-Committee; this is obviously not possible in the case of the retrospective enquiry.

The Italian note ends with a proposal to extend the scope of the enquiry to include all forms of cancer regardless of the organ affected. This proposal is accompanied by suggestions regarding the manner in which this may be carried out and for the amplification of the questionnaires already agreed upon.

The Sub-Committee has not yet had an opportunity of discussing the Italian proposal, which is, in consequence, put forward here merely as a suggestion. The Italian note, which is at the disposal of the members of the Health Committee, deals with this matter in considerable detail. The interesting discussion does not lend itself to condensation. The question is not a very urgent one, and, in any case, it is understood that this proposal to extend the field of the enquiry should not in any way hinder the more limited researches at present being undertaken by the League of Nations.

The Italian delegation also proposes to extend the questionnaire with the object of obtaining information regarding the organic constitution and the functioning of the internal secreting glands. The Italian delegates agree with Professor Fichera, who raised this question. It is not possible to decide at present whether replies to these particular questions are likely to be of assistance in all three of the countries which are participating in the enquiry, in solving the main problem in which the Health Committee is interested.

THE NETHERLANDS.

We have begun the enquiry by supplying detailed information to Dutch doctors regarding the objects of our enquiry into cancer on the lines already published in papers which have been distributed to members of the Health Committee of the League of Nations.

Our questionnaire has been modified to bring it into line with those of the two other countries, and the directors of the most important hospitals in the eleven provinces of Holland have received a circular letter. The provinces of Northern Holland, with Amsterdam as the most important town (population 700,000); Southern Holland, with Rotterdam (population 560,000) and The Hague (population 360,000); Utrecht, with the town of Utrecht (population 140,000); possess the largest hospitals. If to these be added the hospital of the University of Leyden and that of the University of Groningen we have the most important institutions from the present point of view. Finally, there are a certain number of hospitals scattered throughout the country which have their own importance because they serve representative classes of the community, with certain differences as regards customs, occupation, etc.

We are glad to state that almost everywhere we have received that co-operation which is so essential. It seems to us necessary that the replies to the questionnaire should be dealt with by those persons who have been specially entrusted by us with this work. This, indeed, is the only possible way of obtaining exactly the results which we desire. We have up to the present been fortunate enough to obtain the assistance of a lady doctor, Mlle. Van Ramsdenck, who has already begun the enquiry in several towns, notably in Amsterdam and in Alkemaar, a small town in northern Holland, with a rural population which is easily kept under observation. Our enquiry is not sufficiently advanced to enable us to quote figures of any great significance or to draw conclusions of any value.

Annex 10.

C. H. 186

STANDARDISATION OF BIOLOGICAL PRODUCTS.

Letter from M. Rost to the President of the Health Committee.

January 20th, 1924.

Sir,

During the International Conference for the Standardisation of Biological Products, which was held from July 19th to 21st, 1923, under your chairmanship, I ventured to make certain suggestions to you orally in regard to subsequent meetings to which we may be convoked. In accordance with your wishes, I have also discussed my proposals with M. Straub (Munich), M. Abel (Baltimore),

and M. Voegtlin (Washington). As these gentlemen agreed with my views, I venture to send you a written statement of them. In my opinion, the application of the measures which I suggest would present some advantages even from the economic point of view. I consider it desirable that no higher standard of purity should be required for drugs than is necessary in the light of our present scientific knowledge to preclude the possibility of any objection being raised on hygienic grounds. If it were insisted upon that drugs must be absolutely pure and that no foreign element and no residue of manufacture should enter into their composition, the cost of production would become too high; it therefore seems advisable to require absolute purity in drugs only in cases in which this is indispensable from the medical point of view. In the case of many drugs, such as formol, gelatine alba, glycerine and lactic acid, it is very important, even from the economic point of view, that they should be in the condition prescribed by the pharmacopœias; for these drugs are often sold on a large scale, and particularly in international trade, and are destined to be employed for industrial and other purposes in the condition prescribed by the pharmacopœias.

My proposals in no way aim at the establishment of an international pharmacopœia.

1. I propose the standardisation of all regulations relating to the chief alkaloids (simple and compound alkaloids), and especially of those regarding the morphine contained in opium, and cocaine in the form of coca leaves; such standardisation would also have a certain importance in connection with the application of the International Opium Convention.

2. With a view to reducing the cost of drugs, I propose that no higher standard of purity should be required for drugs than is necessary in the light of our present scientific knowledge to preclude the possibility of any objections being raised on hygienic grounds; to this end I propose that the following points should be examined:

(*a*) Whether, and for what drugs, the addition of certain non-injurious substances (such as sodium salts mixed with potassium salts, organic acids added to lactic acid and formic acid, iron in certain salts, and copper compounds in extracts, etc.) could be allowed.

(*b*) Whether, and for what drugs, it would be possible to introduce less strict regulations regarding the degree of purity, particularly as regards mixtures with arsenic and lead, when the introduction of such regulations would reduce the cost of production of the drugs in question without entailing any risk, even for persons who habitually use these drugs (according to certain pharmacopœias, fifty drugs have to be analysed to see if they contain lead, and a hundred to see if they contain arsenic).

(*c*) I propose that the question should be considered whether it is really indispensable, before allowing the sale in accordance with the pharmacopœia of certain drugs, such as cocaine and potassium iodide, to require such a large number of analyses to verify their chemical composition and their degree of purity (see on this point M. Theodore Paul's article "Prescriptions relatives à la composition chimique, l'état de pureté, etc., de certains médicaments"; this article recently appeared in the *Revue de chimie appliquée* (Volume 36, 1923, page 345).

3. In cases in which the pharmacopœias fix maximum doses for adults, I propose that the question should be examined whether uniform rules should not be applied in the various countries and especially in neighbouring countries and countries in which the average weight of individuals is approximately the same.

(Signed) E. Rost.

Annex 10*a*.

STANDARDISATION OF BIOLOGICAL PRODUCTS.

Letter from the President of the Health Committee to the Director-General of the Health Administration at Brussels.

February 16th, 1924.

Sir,

Professor Rost, of the "Reichsgesundheitsamt" (Imperial Health Office) of Berlin, has suggested to me that the conference which deals with biological products should also draw up proposals concerning the standardisation of methods for determining the proportion of active elements contained in powerful drugs and the degree of purity of all the drugs contained in the pharmacopœia.

In the last ten years a number of conferences have studied this question without reaching definite results.

The International Pharmaceutical Conference which met in London last July took up this question and requested the Belgian Government to convene again the Brussels Conference with a view to resuming the study of these questions, and, should it be impossible to convene this Conference, the London Conference decided to apply to the Health Committee of the League of Nations.

Before communicating Professor Rost's letter and the decision of the London Conference to the Committee, I should be glad to know whether you are acquainted with your Government's intentions in this matter.

(Signed) TH. MADSEN,

President of the Health Committee.

Annex 11.

C. H. 182.

STANDARDISATION OF SERA AND SEROLOGICAL TESTS.

Report by Dr. Madsen, submitted to the Committee on February 18th, 1924.

As the Medical Director's report contains an exposé of the development of this question, only a brief account of the present situation will be given,

1. *Anti-diphtheritic Serum.*

The second International Conference on the Standardisation of Sera and Serological Tests, convened by the Health Committee of the League of Nations and held from November 20th to 26th, 1922, at the Pasteur Institute, Paris, having adopted the Ehrlich unit as the international standard for the measurement of the diphtheria anti-toxin, resolved that:

> "In order to ensure that the sera used as standards by the various States have identical titre, it would be well if Professor Madsen, acting as Director of the Serotherapeutic State Institute of Denmark, which institute has been designed to act for this purpose as a central laboratory for the Health Committee of the League of Nations, should arrange for comparative studies of such sera to be carried out every year."

In accordance with this resolution, the Copenhagen Institute, in December 1923, made a comparative test of the United States unit (sent from the Washington Hygienic Laboratory) and of the German unit of the Institute of Experimental Pathology, Frankfort, and found them to be identical. At the same time the diphtheria standard serum of the National Institute of Medical Research (Imperial Medical Research Council) submitted for examination was found to be identical in strength with the German and American units.

2. *Anti-tetanic Serum.*

At the Paris Conference the principle of a new anti-toxic unit was adopted, based on the American unit and possessing half its anti-toxic power. A great deal of laboratory work was done in the adjusting of this new international unit.

Professor Kolle, of the Institute of Experimental Pathology in Frankfort, has completed his titration, and the new unit is being tested in Copengagen and Washington. It is hoped to complete this work during the next few months.

3. *Anti-dysenteric Serum.*

(*a*) *Anti-toxic power* (Shiga-Kruse bacillus).

At the Paris Conference the Sub-Committee for the Study of Dysentery expressed the opinion that it was unnecessary to consider the anti-infectious power as distinct from the anti-toxic power of this serum.

Various opinions were put forward, regarding the best method of standardising this anti-toxic power, as to whether rabbits or mice should be employed, and if the injection should be subcutaneous, intraperitoneal or intraveinous. Different toxins were suggested for the tests.

The whole comparative investigation has been greatly delayed by the difficulty in obtaining some of the toxins involved. Obstacles were overcome a few months ago, and recent reports show that considerable progress has been made.

As regards the method of testing, the different workers have come into closer agreement, the most uniform results reported being those obtained by intraveinous injections in mice. As soon as definite agreement has been reached as to the best method of testing, a final agreement on the standardisation of the anti-toxic power could probably be reached by using a standard serum in the same manner as in the case of the diphteria and tetanus units.

(*b*) *Anti-infectious Power.*

Professor Shiga, who was unable to attend the Paris Conference, recently presented a report stating that in his experience the anti-infectious power does not run parallel with the anti-toxic power but possesses a greater therapeutic importance. He is sending a special report on the therapeutic effect of the dysentery serum.

This statement, from an expert of Professor Shiga's authority and great experience, will naturally necessitate a close examination of the question of the relation between the anti-toxic and anti-infectious powers. Should it finally prove that they do not run parallel, the standardisation of both may be necessary.

The desirability of effecting a standardisation of this essentially important serum is evident, especially as several authors claim that the unsatisfactory results sometimes obtained by this treatment are due to the fact that many weak sera are on the market and that treating clinicians have no means of controlling their quality.

4. *Anti-pneumococcal Serum.*

Following on the discussions at the Paris Conference, it was decided, in view of the complexity of the problem of standardising this serum, to begin the investigation by examining only the anti-infectious power against pneumococci type I.

Using the same method of examination — mixture of serum and culture, intraperitoneal injection into mice — it was found that if a series of sera were tested against type I in different laboratories, the relations between their anti-infectious powers were found to be the same. These comparative investigations are still proceeding.

If such stable relations between different sera are invariably found in different institutes, a basis for comparison of pneumococcus serum type I can be established by means of a standard serum.

As in the case of dysentery serum, it is claimed that the great divergence as regards the therapeutic value of anti-pneumococcus serum is due to the very great variation in the strength of these sera.

Types of Pneumococci.

In order to properly judge the value of the anti-pneumococcal serum, a knowledge of the different types of pneumococci is desirable.

A great deal of information was obtained at the Paris Conference. It was considered very necessary to obtain further knowledge about conditions outside Europe and the United States. The Medical Research Council in England has been good enough to undertake this investigation, which will obviously take considerable time.

5. *Anti-meningococcal Serum.*

Opinions on the principles for standardising this serum vary so greatly that there is no likelihood of an agreement in the near future, and a very thorough investigation is desirable.

The examination of different types of meningococci is proceeding, but little progress has been made, as cases of meningococcal meningitis were rare in Europe last year.

6. *Anti-streptococcal Serum.*

By a resolution of the Paris Conference (anti-pneumococcus Sub-Committee) a study of the anti-streptococcus serum was considered desirable.

Professor Morgenroth (Institute for Infectious Diseases, Berlin) is now making an extensive study of this serum, the activity of which, in spite of its widespread use, is very debatable. This investigation is not yet completed.

7. *Serodiagnosis of Syphilis.*

See the Report of the International Copenhagen Conference. (C5. M5. 1924. III).

Annex 12.

C. H. 160 (1).

THE CAMPAIGN AGAINST MALARIA.

Report of the Malaria Sub-Committee, submitted to the Health Committee on February 19th, 1924.

The Malaria Sub-Committee, which was appointed by the Provisional Health Committee in conformity with a resolution adopted at the Committee's sixth session, is composed of the following members:

Dr. A. LUTRARIO, Chairman;
Sir George BUCHANAN;
Professor Léon BERNARD.

The first meeting of the Malaria Sub-Committee took place on June 6th, 1923 at the Paris Office of the League of Nations.

After a discussion the Sub-Committee agreed on the following preliminary measures:

1. The appointment of three specialists, at the suggestion of Sir George Buchanan.

The following experts were appointed:

Col. S. P. JAMES, M.D.;
Professor MARCHOUX;
Dr. LABRANCA.

2. The advisability of drawing up a questionnaire, as a basis for a preliminary enquiry into the malaria situation and into the various aspects of the anti-malaria campaign in Europe.

The procedure to be followed in drafting the questionnaire was also laid down.

The second session of the Malaria Sub-Committee, which Sir George Buchanan was unable to attend, was held on August 1st, 1923, at the Paris Office of the League of Nations. The three experts and two officials of the Health Section of the League of Nations (Mr. Sydenstricker and Dr. Druetti) also attended the meetings.

The preliminary draft of the questionnaire drawn up by the Health Department of the Italian Ministry of the Interior was submitted to the Sub-Committee for consideration at this second session. Two meetings were devoted to the consideration of the questionnaire point by point. It was then drafted in its final form.

Subject to the approval of the Health Committee, the questionnaire may be sent to the competent departments of the various countries.

Meanwhile the Health Section has taken preliminary steps to secure the appointment of experts as malaria correspondents in each of the countries to which the questionnaire will be sent. For this purpose the Health Section has applied to experts of recognised authority in certain countries such as Bulgaria, the Kingdom of the Serbs, Croats and Slovènes, Austria, Spain, Portugal and Russia. It has sent them the questionnaire unofficially in order to give them an idea of the importance of the work to be accomplished, which is unquestionably of a most comprehensive character.

Furthermore, Colonel James has latterly conducted an enquiry in England, the Netherlands and Denmark; in the two latter countries Dr. Swellengrebel and Dr. Hansen respectively took part in the enquiry. The main object of this enquiry was to gain more exact information on the factors which have contributed to the disappearance or decrease of incidence of malaria in those countries

The Health Section has received information that since 1905 a special relief society has been in existence in Greece for the purpose of combating malaria; it has therefore applied to this society for documentary information concerning its campaign of prophylaxis. A similar request has been addressed to the Spanish Committee at Barcelona for the Campaign against Malaria. It is anticipated that the information thus obtained will be of great assistance to the Malaria Sub-Committee in the work.

In conformity with the recommendation of the Malaria Sub-Committee at its first session, Dr. Haigh has carried out a preliminary investigation of the situation in Albania. The information which he has collected concerning the incidence of malaria in that country, and the possibility of adopting practical prophylactic measures, is set out in a very important report, which has been submitted to the Sub-Committee.

It would seem that the work should be continued on the following lines:

The health departments of the countries concerned should be invited to appoint malaria experts as their technical correspondents.

The latter will be asked to collect information in their respective countries regarding the malaria situation and will draft a general report in accordance with the principles laid down in the questionnaire. They may also suggest or carry out in person, under the supervision of the health authorities, investigations in regard to special problems connected with this disease.

These experts will be invited either by the Health Section or by the Malaria Sub-Committee to give their opinion on the measures to be adopted in their respective countries.

They may also be invited to attend the meetings of the Sub-Committee, together with the latter's own experts, in an advisory capacity, in connection with general questions relating to the problem of malaria.

The Malaria Sub-Committee, in conjunction with the Health Section of the League, will collect the replies and draw up a general report on malaria in the countries affected and on the prophylactic methods commonly employed.

The results of these investigations and the conclusions reached will be submitted to the Health Committee.

Subject to instructions from the Health Committee, the Malaria Sub-Committee will, with the help of the experts and, if necessary, of the malaria correspondents also, examine, both from an administrative and practical point of view, any question concerning malaria, which is submitted to the Health Organisation.

Lastly, mention should be made of the appeal addressed to the League of Nations by the Greek Ministry of Health inviting the League to come to the assistance of Greece, where malaria has become prevalent throughout almost the whole country. The Ministry requests that a special commission should be despatched to Greece to obtain a clear insight into the epidemiological situation and the efforts of the authorities to combat the disease.

As regards the *quinine problem*, the main points are:

1. To determine whether the total quantity of quinine produced by all the factories in the world (600,000 kgs. per annum can be regarded as sufficient for the requirements of prophylaxis on a large scale);
2. To consider the possibility of extending the cultivation of cinchona;
3. To consider the advisability of establishing new quinine factories under government control with a view to obtaining pure and inexpensive products.

To study the question of the quantities of quinine required, it would perhaps be desirable to hold a conference of the representatives of the health departments of the various countries in which malaria is an important and urgent problem. The Health Committee could place its experts at the disposal of this conference, and it might be possible to consider the appointment of technical specialists, to supply the health administrations of the various countries with full information and advice concerning the establishment of industries connected with the production of quinine, such as cinchona plantations and quinine factories.

The formation of depots for the supply of seeds might also be of great service in facilitating the planting and cultivation of the best species of cinchona.

The combined activities of the Health Organisation of the League of Nations and of the conference might thus effectively contribute to the practical solution of the quinine problem, which is so closely related to the problem of malaria.

C. H. 157.

Annex 12*a*.

REQUEST OF THE ALBANIAN GOVERNMENT FOR THE APPOINTMENT OF A MEDICAL ADVISER BY THE LEAGUE OF NATIONS

Letter dated September 28th, 1923, from the Albanian Delegation to the Fourth Assembly of the League of Nations to the Director of the Health Section.

(Translation)

Sir,

Albania is a prey to three serious diseases-malaria, phthisis and syphilis.

Dr. Haigh, who was sent on a mission by the League of Nations, has no doubt already submitted his report on malaria and the methods to be used in combating it.

The Albanian Government, though its available resources are small, has made great efforts to combat these diseases.

I am, however, of opinion that infinitely more valuable results would be obtained, and that these serious evils might be stamped out in a short time, if the League of Nations would send a specialist to Albania to co-operate for a certain period with the local authorities and the people.

I should therefore be very grateful if you would assist in the organisation of the campaign against these diseases by using all your influence to procure the despatch of a specialist to Albania and to provide for his remuneration.

(Signed) Midhat FRASHERI,
First Albanian Delegate to the Fourth Assembly of the League of Nations.

C. H. 156.

Annex 12*b*.

DESPATCH OF A MEDICAL COMMISSION TO ENQUIRE INTO THE PREVALENCE OF MALARIA IN GREECE.

Letter dated December 17th, 1923, from the Greek Ministry of Health submitted to the Committee on February 19th, 1924.

(Translation)

Sir,

I have the honour to communicate to you a French translation of a Note from the Greek Ministry of Health concerning malaria in Greece, which shows that this disease has spread to nearly every part of the country and has in certain districts assumed a malignant character.

Notwithstanding its other commitments, my Government, as you will realise, is doing its best to combat this disease, but its resources are inadequate. It needs 9,000 kgs. of quinine, but has only 500 kgs. at its disposal. Other urgent needs are ambulances to travel through the provinces and bring assistance to malaria patients, gangs of workmen to drain swamps and exterminate mosquitoes, and other sanitary measures necessitating a staff possessed of special qualifications, which cannot be acquired unless schools are established for the purpose.

My Government is therefore obliged to appeal to the League of Nations and to ask it for help either directly or through the intermediary of such great philanthropic institutions as the Rockefeller Institute. In order that the League of Nations may gain a clearer idea of the situation, my Government further suggests that a medical commission should be sent to Greece. A decision to this effect by the League of Nations would be received in Greece with the utmost satisfaction.

Awaiting the decision of the Secretariat of the League of Nations etc.

(Signed) V. Colocotronis.
Counsellor of Legation,
Director of the Greek Secretariat.

MALARIA IN GREECE.

(Translation)

Note from the Greek Ministry of Health.

During the last summer and autumn, malaria has made its appearance throughout the whole of Greece, except in a few islands in the Ægean Sea. Its endemic character was particularly notable in the prefectures of Aetolia and Acarnania, in nearly the whole of Eastern Macedonia, in Thessaly, at Elassona, at Florina, in the Philippiad Valley, in the provinces along the Louros river and in the prefectures of Prevesa and Boeotia. Malaria has been particularly rife among the refugees settled in rural districts under unsatisfactory conditions. In the absence of better remedies, the public health service has confined itself to the use of quinine. Unfortunately, many persons have not taken this remedy regularly, with the result that in certain localities malaria has assumed a malignant character and cases of hæmoglobinuria have made their appearance.

To combat this endemic, a special service has been organised to give quinine treatment in chronic cases. The number of indigent persons to whom this treatment will still have to be given is estimated at 300,000, and 9,000 kgs. of quinine will be required. At present the Government has only 500 kgs. at its disposal, and it would be very grateful for any supplies of quinine the League of Nations might be able to offer.

One-third of the population of Greece, or about 2,000,000 persons, is suffering from malaria. In view of overcrowding and the influx of refugees into every town, the disease has now spread over almost the whole of the territory of Greece, and cases of malaria have been noted in provinces which had hitherto been immune, such as the Ionian Islands and the islands of the Ægean Sea.

A competent staff has studied a series of measures for combating the disease. Ambulances with doctors and attendants are very urgently needed to travel through the provinces and give assistance to malaria patients. Gangs of workmen will also be formed to purify the water and exterminate the mosquitoes. Furthermore, the Government is considering a series of measures providing for the compulsory drainage of marshy areas.

The above measures can only be applied by a staff with special training, and this cannot be obtained unless schools are established on the model of the *ad hoc* laboratories which exist in Italy *(Nettuno Venezia)*. By having recourse to philanthropic institutions such as the Rockefeller Institute, which could supply the necessary material, the League of Nations could be of great assistance in establishing two schools of this type at Athens and Salonika, and in supplying as large a quantity of quinine as possible.

If the mortality from malaria is to be reduced, the most strenuous work will have to be carried out during the winter and next spring.

Should the League of Nations consider that, in order to ensure the assistance of the institutions mentioned, it would be advisable to send a medical commission to Greece to gain a clear idea of the situation and to observe at first hand the work of the public services concerned, the Greek Government would hail such a decision with the greatest satisfaction.

C. H. 183.

Annex 12*c*.

EPIDEMIC SITUATION IN PERSIA.

Letter addressed to the Secretary-General by the Persian Delegation to the League of Nations.

February 9th, 1924.

Sir,

With reference to the conversation we had yesterday, I have the honour to forward herewith a memorandum on the public health situation in Persia and would ask, in the name of my Government, for the assistance of the League of Nations in a campaign against these epidemics.

(Signed) P. ARFA-AD-DOVLEH.

The memorandum referred to in the above letter was prepared by Mr. Mac Cormack, Director of Internal Revenue Administration.

It calls attention to the appalling sanitary conditions in Persia at the present time. Malaria, tuberculosis, syphilis, intestinal disease, trachoma and typhoid are all widespread. According to a report issued by the Sanitary Council of Persia, recurring epidemics of the following diseases have occurred during the past 11 years (1912-1922). (The number of years in which the disease was epidemic is stated against each):

Cholera	5 years	Malaria	4 years
Influenza	2 »	Smallpox	4 »
Bubonic plague	7 »	Typhoid fever	6 »
Pneumonic plague	1 »	Typhus fever	3 »
Relapsing fever	3 »		

Of the diseases mentioned, malaria and syphilis are the most widespread and probably the most serious. In certain districts malaria has been so severe that villages have had to be abandoned.

Bubonic plague is said to be endemic and to have existed more or less continuously in Persia since 1880.

Cattle disease, notably anthrax, is said to be very prevalent. It is not unusual for a village to lose from 25 to 40 per cent of its animals in a single bad season.

Scientific knowledge, physicians and even drugs are insufficient to combat these conditions. In the chief towns there is a limited number of foreign-trained physicians, but in the rural areas, where the ravages of malaria are most serious and among the tribes where syphilis is so widespread, medical assistance is altogether inadequate.

The most urgent requirements are stated to be:

1. A comprehensive sanitary survey and the preparation of a sanitary programme;
2. Establishment of dispensaries through which quinine might be distributed either free or at cost price;
3. The establishment of an effective quarantine service;
4. The provision of medical education;
5. The provision of a trained personnel for the preparation and execution of sanitary plans, and
6. The provision of the necessary funds.

At present all these are lacking.

It is for the consideration of the Committee whether or not it would be possible for the Health Organisation of the League of Nations to undertake or to assist the Persian Government

in undertaking a sanitary survey of existing conditions in Persia. Detailed knowledge regarding the prevalence of epidemic disease in Persia is altogether lacking and it is of very great importance, above all to the administrations of those countries adjoining Persia, that such information be obtained. The existence of foci of infection of some of the diseases enumerated above is of international interest and concern.

C. H. 188.

Annex 13.

BUDGETARY ESTIMATES OF THE HEALTH ORGANISATION FOR THE FINANCIAL PERIOD 1925

			Swiss Francs
I.	SECRETARIAT:		
I.	*Salaries of the Health Section*		268,125
	Medical Director	51,500	
	Member of Section, Class A	26,000	
	Technical Officer	25,000	
	4 Members of Section, Class B	57,000	
	1 Secretary of Section	12,000	
	3 Secretary shorthand-typists	29,000	
	1 Draughtsman	10,000	
	1 Bi-lingual shorthand-typist	8,500	
	1 Typist	7,300	
	7 Clerical assistants	41,825	
II.	*Salaries of Temporary Staff charged to the Rockefeller Foundation* (Grants 1, 2 and 3, total 590,160)		171,790
	Chief of the Epidemiological Intelligence Service	41,440	
	1 Epidemiologist	37,500	
	1 Member in charge of interchanges	25,900	
	1 Statistician	25,900	
	1 Member in charge of medical intelligence and publication	15,800	
	1 Assistant statistician	12,950	
	1 Assistant	12,300	
III.	Travelling expenses		45,000
IV.	General printing and documentation		6,000
V.	Cables, telegrams and telephones		10,000
VI.	Unforeseen contingencies		5,000
II.	EPIDEMIOLOGICAL AND PUBLIC HEALTH INTELLIGENCE		310,334
	1. Special reports and enquiries	100,000	
	2. Publications	60,000	
	3. Sanitary notifications and notifications in case of epidemics	15,000	
	4. Grants to Epidemics Commission	50,000	
	5. Collective and individual studies of public health statistics	(5,000)	
	Rockefeller Grant III	(80,334)	
III.	HEALTH COMMITTEE AND CONFERENCES:		
	1. Sessions of Health Committee	75,000	285,000
	2. Special investigations (this includes expenses of technical sub-committees appointed by the Health Committee	160,000	
	3. Technical conferences	50,000	
IV.	INTERCHANGES:		
	1. System of liaison	75,000	357,715
	2. Collective, individual and specialised interchanges: (Rockefeller Foundation, Grant I)	282,715	
			1,458,964
	Total of three Rockefeller Grants		590,160
	Sum allocated by the League of Nations		868,804
	Deduct: Reduction in salaries according to the fall in the cost of living	11,500	
	Sum allocated by League of Nations for 1924	641,120	
	Estimated supplementary appropriation for 1925		216,184

Annex 14.

FUNCTIONS OF THE EPIDEMIOLOGICAL INTELLIGENCE BUREAU FOR THE FAR EAST

Report of the Sub-Committee approved by the Committee on February 20th, 1924.

I. The functions of this Bureau, as at present contemplated, may be stated as follows:

(*a*) to collect and transmit at regular intervals, from all Far Eastern countries, information regarding the incidence and spread of infectious diseases, especially in ports and their hinterland;

(*b*) to collect and transmit periodical returns of vital statistics, etc., in Far Eastern ports;

(*c*) to collect data regarding alterations, additions or amendments to sanitary laws and regulations, and regarding measures taken to combat transmissible diseases and to prevent their propagation;

(*d*) to publish at regular intervals returns, data, tables and general vital statistics regarding Far Eastern countries;

(*e*) to transmit all the above-mentioned information periodically to the ports and health administrations of all the Far Eastern countries concerned, and also to the Health Section of the League of Nations, whose duty it would be to communicate them to the Office international d'Hygiène publique and to the various health administrations;

(*f*) to render all possible assistance to the Governments concerned in matters which fall within its competence.

II. In the Far East there are approximately 75 ports of sufficient (though varying) commercial importance to call for regular attention. On this basis it is estimated that in addition to the routine work of collecting, filing, checking and tabulating the statistical data received, about 100 incoming and as many outgoing letters and telegrams will have to be dealt with daily.

The cost entailed has been roughly estimated as follows:

Staff (including travelling expenses)	$ 23,500
Rent, etc.	3,500
Office equipment, etc.	1,500
Electricity and miscellaneous charges	850
Telephone charges	150
Cablegrams, postage, etc.	20,500
Total	$ 50,000

It will be noted that cablegrams and postage constitute one of the largest items. Expenditure under this head will depend upon the amount of assistance given by the Governments concerned and by the extent to which broadcasting is used in disseminating information.

The initial cost of furnishing the Bureau could be borne by the first year's budget, as it is unlikely that the whole staff would be engaged at once.

These estimates are, of course, from their nature, only approximate.

III. The expenses of this Bureau, the establishment of which would save the Governments of the Far Eastern countries the present cost of their correspondence on health matters, would be met in part by contributions from the local Governments concerned (either regular subsidies or payments for services rendered), in part by contributions from the Rockefeller Foundation and in part by the revenue of the Bureau itself, which, it may be hoped, will in course of time equal the expenditure.

C. H. 180.

Annex 14*a*.

EPIDEMIC DISEASES IN THE FAR EAST.

Report by the Sub-Committee (Scientific) submitted to the Committee on February 20th, 1924.

On further study of Dr. Norman White's report, the Commission gained an even clearer impression of the enormous amount of work accomplished and the endurance and energy displayed by its delegate. It desires once more to express to Dr. Norman White the grateful appreciation of the Health Committee and to congratulate the Medical Director on having found a collaborator possessing such a thorough knowledge not only of Far Eastern conditions but also of pestilential diseases.

In addition to extremely valuable information on the sanitary organisation of, and the epidemiological situation in, the ports, Dr. Norman White has made some interesting suggestions which will be profitably examined by the Committees set up to frame a convention. His previous investigations and the observations made in the course of his mission have led him to submit also his personal views on the epidemiology of plague and, in particular, of pneumonic plague.

As the author candidly admits, it is impossible to discuss here the very ingenious theory regarding *pneumonic plague*, a disease totally distinct from *bubonic plague*. Only experiments and laboratory research will make it possible to solve this question and to determine the part played by symbosis between various organisms.

Although it would not be wise at the present stage of scientific research to draw prophylactic conclusions from this theory regarding pneumonic plague, certain facts are recorded in Dr. Norman White's report which the Sub-Committee unanimously accepts.

There is no doubt that too great an importance has been assigned to man in the propagation of plague. Not that man is incapable of directly transmitting this disease. We know cases — rare, but conclusive— of bubonic plague being transmitted from man to man, but only in eminently ecto-parasitic surroundings.

The pandemic form of pneumonic plague appears to be localised in the North East of China and Siberia and, up to the present, conditions in the southern regions of the Far East and of Europe do not appear to have been favourable to its extension; subject to due reservations, therefore, pneumonic plague may be considered as relatively unimportant, in so far as the framing of regulations for maritime traffic is concerned.

Pneumonic plague, as met with in Europe, in North Africa and in America, has never formed anything but small foci centres which were easily stamped out.

Despite these considerations, we must not, however, exclude the possibility of danger from this disease; the variations in what the ancients called the *epidemic spirit* are well enough known, as also its manifestations, which differ so greatly according to place, times and conditions, which as yet are unknown.

From the practical point of view, we may consider it as established that *human plague is in all cases a concomitant of epizootic plague.* It is, therefore, the rat and not man which represents the danger against which measures must primarily be taken.

If it is the case that certain ports, as, for instance, Manila, Shanghai and the Formosan ports, have succeeded in totally eradicating plague, the Sub-Committee is anxious that the attention of the Governments interested in this question should be drawn to these facts and that they should be informed of the measures which made it possible to achieve this remarkable result.

All observations made by epidemiologists in the East, as well as in Europe, show that epizootic plague is in any case tending to disappear; *only reinfection keeps it alive, and it is of the greatest importance that such reinfection should be prevented.*

It is essential that all vessels and goods coming from infected ports should be protected from rats before embarkation; that such vessels should be cleared of rats before their departure, and that goods liable to carry infection should be isolated under conditions such as those laid down by Dr. Norman White.

C. H. 189

Annex 15.

EPIDEMIOLOGICAL SUMMARY OF PLAGUE, TO BE USED AS A BASIS FOR GENERAL PROPHYLACTIC INSTRUCTIONS

Memorandum by Professor Jorge submitted to the Committee on February 20th, 1924.

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1. In plague a distinction must be made between two important forms of the disease: bubonic plague, the original seat of which is in the ganglia and which is sometimes accompanied by pulmonary complications (secondary pneumonia); and pneumonic plague, which originates in and is confined to the lungs.

These two forms develop as if they were epidemic diseases entirely different in all their aspects — clinical, prognostic, epidemiogenical and prophylactic.

2. The secondary and primary pneumonias differ in their course, gravity and contagiousness.

Secondary pneumonia develops less rapidly than primary pneumonia, which usually runs its course in three days. The former, although very grave, spares at least 10 to 20 per cent of those it attacks, whereas the latter is always, or nearly always, fatal, and its mortality is everywhere practically 100 per cent. Moreover, they are not equally transmissible; primary pneumonia is highly contagious.

3. Pneumonic plague occurs sporadically during outbreaks of bubonic plague, or subsequently. Among bubonic cases pulmonary cases occur, sometimes isolated, sometimes in series transmitted by direct or indirect contagion from an original case; a kind of chain or a series of chains of cases is formed connected with each other by contagion through direct personal contact. At other times, these series of cases occur independently of bubonic outbreaks, and cases of pneumonic plague have been known to occur spontaneously, *i.e.*, without showing any immediate connection with bubonic cases. But, hitherto, pneumonia has only broken out in places which had previously been visited by ordinary plague: when it occurs in a place hitherto free from infection, the presumption is that it has been imported.

4. The ancient and recent annals of pandemics show that if the outbreak lasts long enough, sooner or later plague will be accompanied or followed by pneumonic cases. Such cases are usually few in number, not exceeding 2 to 3 per cent of the total of bubonic cases. The series may comprise a varying number of cases, but usually not a large number.

According to information communicated to the Committee of the Office international d'Hygiène, it would appear that both epidemics and pneumonia have become somewhat more frequent, even in tropical climates. It is rare for them to break out on a large scale, however, like the great plague of Manchuria in 1911 and the Black Death of 1348, which depopulated Europe under both the bubonic and pulmonary forms.

Its diffusibility is consequently very variable. It is extremely contagious, but its transmission as a general rule requires close and prolonged contact.

5. It may be regarded as an established fact that pulmonary plague is derived from bubonic plague, but the causes through which bubonic plague is thus converted into pneumonic plague are not yet known; the details of this epigenesis escape us. Although the two forms are divergent, they have a common origin, the infection being materially the same. The nosological unity of the plague has for a long time past been recognised by epidemiological observation, and it has been confirmed by bacteriology, for Yersin's bacillus, with its specific characteristics, is found free from all other elements in both forms. It has been suggested that there is a pulmonary variety of the bacillus or a special symbion associated with the plague bacillus, but these are pure hypotheses as yet devoid of any foundation.

The case of the pneumonic outbreak which occurred in 1898 in the Vienna laboratory, where the bacillus of ordinary bubonic plague was being handled, will be remembered; we refer to the well-known case of Dr. Müller and his assistants.

6. Whereas pneumonic plague spreads by direct human contact, bubonic plague has an essentially epizootic origin; rat plague precedes and accompanies human plague.

It is possible for bubonic plague to be transmitted also by human contact, victims of the disease and even healthy persons being undoubtedly able to convey the infection through fleas infected with bacilli. Cases appear and small epidemics break out which have no other origin. There have been many examples of this kind in the last few years, but the chief vehicles of the disease are plague-stricken rats and their fleas; the constant recurrence of plague in maritime towns and the contamination of seaports and vessels are the exclusive work of rats and their fleas. This fact is the key to the epidemiology of plague and its rational prophylaxis.

7. The progress of plague is strangely capricious. Why does it spare certain ports in the vicinity of infected areas and attack others which, owing to their geographical and commercial position, should be safe from infection — why in some places is it a "pestis minor" of almost

negligible importance and in other places a formidable scourge — why in some places does it only make briefs visits and in others take root and become a persistent endemic ? These are all obscure points of a kind with which epidemiology abounds.

It frequently happens that epizootic plague takes root in a harbour without having any effect on man, or causing only a small number of human cases. The manner in which an epizootic among rats becomes established and then transforms into an enzootic is not known. Moreover, epidemics of plague unaccompanied by a corresponding epizootic are observed fairly frequently; despite the most thorough search, it is impossible to find the infected rats.

8. Notwithstanding its virulent and fatal character, pneumonic plague is easily mastered; the cases are closely inter-connected; all that need be done is to break the chain by isolating the patients and those who have come in contact with them. The same methods can be applied to bubonic plague to prevent the possible, but rare, transmission from one human being to another.

The essential prophylaxis must be directed against rats; the most effective methods are those which aim at checking their propagation. In combating an epidemic, the use of anti-propagative preparations (creoline, petroleum, etc.) should not be neglected by the disinfecting staff.

As regards transmission at sea, cases of human plague, either of the bubonic or pneumonic variety, are of comparatively small importance. It may be said that bubonic cases have no serious significance, except when they indicate an epizootic on board.

The rat and not man is to be feared. Even vessels classed as free from infection transmit the plague to their port of destination, if they carry in their holds a cargo of plague-stricken rats. It is such ships that have spread the plague through the seaports of the five continents of the globe.

The infection is carried specially through the medium of goods which serve as shelter and food for rats, such as cereals, oleaginus grain, etc. Such goods should be inspected with the greatest strictness, both in warehouses and when they are loaded and unloaded, if the circulation of rats which propagates plague and spreads it throughout the world is to be prevented.

Annex: 16.

EPIDEMIOLOGICAL INTELLIGENCE SERVICE.

Recommendations of the Sub Committee approved by the Committee on February 20th, 1924.

The Sub-Committee begs to present to the Health Committee for approval the results of its examination of the programme for the epidemiological intelligence service, which it has carried out in accordance with the mandate conferred upon it by the Committee.

The proposals contained in the Medical Director's report and in Mr. Sydenstricker's report are adopted in their entirety.

(1) *Monthly Report.*

In view of the very favourable expressions of opinion which the monthly report has evoked, the Sub-Committee considers that this publication should be continued and that such improvements should be made therein as experience shows to be possible.

As the monthly report is drawn up by the Health Section, the Committee considers that the headings or prefaces should clearly indicate that the comments are those of the Health Section and do not in any way involve the responsibility of the Health Committee.

A telegraphic information service will be established only as an experiment, between certain carefully selected countries, in order that the credits available may not be exceeded.

The publication of information concerning syphilis and other diseases not at present dealt with in the monthly report may be undertaken in the form of quarterly summaries issued as annexes to the monthly report.

(2) *Annual Report.*

The Sub-Committee proposes to authorise the Health Section to publish a Year-Book for 1923 on morbidity and mortality from infectious disease. This Year-Book need not be submitted to the Committee for approval, as it is understood that the various suggestions previously put forward by the members of the Committee and the Sub-Committee will be given due consideration.

(3) The health enquiries and the reports on demographic statistics will be continued in conformity with the Medical Director's proposals.

(4) The proposed interchange of statisticians is approved on the understanding that it will be limited on this occasion to medical statisticians.

Relations should be established with the International Statistical Institute.

The Medical Director is authorised to appoint a limited number of experts to study the comparative value of demographic statistics and other similar questions. The Medical Director is authorised to take all necessary steps for this purpose. He will come to an understanding if necessary with the departments concerned in various countries for the choice of statistical experts in the service of the State (Great Britain, for example).

(5) The proposals to publish special reports (for instance, on the morbidity and mortality from meningitis and tuberculosis) are approved. The Committee defers its decision as regards the investigation of the periodicity of influenza.

The Sub-Committee has examined a proposal for the immediate appointment of a Permanent Sub-Committee to act as an Advisory Body to the Health Section on important questions of policy or administration raised by the Service of Epidemiological Intelligence and Vital Statistics. It has decided, however, that it would not for the present be advisable to submit a recommendation on this subject to Health Committee.

C. H. /V. E./ 9 (2).

Annex 17.

SANITARY CONTROL OF TRAFFIC ON WATERWAYS.

Report by Dr. A. Lutrario to the Committee on February 20th, 1924.

The Mixed Sub-Committee of the Health Committee and the Committee for Communications and Transit which was instructed to consider the draft Convention approved by the Health Committee at its session in May, 1923, examined it at the meetings which it held at Geneva last August.

The draft has been subjected by the Mixed Sub-Committee to alterations both of form and of substance.

The changes of form can be readily accepted; of the changes of substance some may be adopted, but others call for reservations and require special consideration.

* * *

1. The general character of the substantial alterations and the reasons for them will be clearly seen, not only from a comparison between the two texts but also from the Sub-Committee's Minutes, to which I shall therefore refer.

These documents show that the Mixed Sub-Committee has adopted wording for the first articles which makes it possible to turn the draft either into a model convention for States which intend to conclude special agreements regarding the health control of traffic on waterways or into a general convention.

This conception does not impair the basic principle of the draft and may therefore be accepted.

2. The Mixed Sub-Committee has combined in a single article (Article 31 of its text) all the provisions regarding the relations between the Contracting States and the League of Nations, which were contained in Articles 4, 6, 7 (second paragraph), 8 (second paragraph), 11 and 12 of the Health Committee's text.

This alteration may be accepted.

3. It has deleted paragraph 4 of Article 9 of the Health Committee's text (extent of affected area, etc.), on the ground that the information asked for in this paragraph is not absolutely necessary — a view which may be accepted.

4. It has divided Article 14, which deals with the sanitary equipment of vessels, into two separate articles (9 and 16 in its text); this change can be agreed to.

5. It has decided that it is not necessary for the word "stop" to appear on the placards indicating health stations (Article 17 of the Committee's text). This decision can be approved, in view of the fact that the bill of health, which every vessel must possess, gives the name of the next health station at which the vessel must call for inspection.

6. It has decided not to retain, even in the form of a recommendation, the provision concerning the holding of special courses of instruction for the staff of health stations (Article 20 of the Committee's text), in view of the fact that the special qualifications required of the staff are indicated by implication in Article 16 of the Committee's text. This decision gives rise to no objection.

7. It has decided not to require the indication of the colours of the flags and lights whereby attention is directed to health stations and water-supply stations. No objection need be raised to this, in view of the fact that the stipulation regarding such flags and lights was only inserted tentatively in the Committee's text.

8. It has decided in the negative the question regarding the collection of dues, which had been reserved for further consideration. No objection need be raised to this decision (Article 23 of the new text). It has also laid down the principle that, in applying the Convention, the Contracting States should make every endeavour to reconcile the interests of trade with those of public health. There is no reason why this principle, which governs the whole of the draft, should not be expressly laid down in the form of an article.

* * *

In addition to these alterations, which, as I have already observed, are acceptable, the Mixed Sub-Committee has made others regarding which I feel bound to offer the following observations:

1. It has been noticed that in drafting the new text the words "to ensure the inspection of vessels at least once in every 24 hours" in Article 11, paragraph (*b*) (new text), have been omitted.

The following words have therefore been added as a separate paragraph at the end of paragraph (*b*) of the article in question: "It is desirable that vessels should be inspected at least once in every 24 hours".

2. Although there can be no objection to the amalgamation of Articles 18 and 19 in the Committee's text, as proposed by the Mixed Sub-Committee (Article 13 of its text), the same cannot be said with regard to the omission of the indication of the bacteriological services, which must be directly or indirectly attached to isolation premises. Consequently, section 2 of the second paragraph of the new Article 13 has been reinstated.

3. It is proposed to add a second paragraph to Article 17, which would read as follows: "The High Contracting Parties undertake to inform each other without delay of the establishment of health supervision in any particular area or areas". This paragraph is necessary in order that it may be known, for all purposes connected with health supervision, in which areas such supervision has been established.

4. The Mixed Sub-Committee has not thought it necessary to enumerate in Article 19 the measures of prophylaxis to be taken in the event of plague, as provided in Article 26 (*c*) of the Committee's text. It would seem desirable to restore the original text and to enumerate in it these measures, which are indeed explicitly provided for in paragraph 3 of Article 12 of the new draft International Health Convention. The Sub-Committee of the Health Committee has therefore decided to add in paragraph (*c*) of Article 19: "to prevent rats from coming on board in the event of plague", and to restore in paragraph (*a*) of the same Article in place of the words "showing symptoms of" the words "showing definite symptoms of or suspected of suffering from".

5. As regards Articles 20 and 21 of the text proposed by the Mixed Sub-Committee which corresponds to Article 27 of the Committee's text, the Sub-Committee of the Health Committee has noticed a further omission, viz., as regards medical surveillance. It has therefore decided to restore paragraph (*d*) with slight modifications.

The text would then read: "To subject to health surveillance any other persons on board whose names may be notified to the competent authorities of the places of destination".

As regards this Article (No. 27) of the Committee's text, the Mixed Sub-Committee has also made certain observations concerning compulsory vaccination.

These observations would appear to be well-founded in view of the diversity of the regulations established on this point by different Governments. I am of opinion that while agreement is possible as to the right to demand a vaccination certificate, it ought nevertheless to be stipulated that specific vaccinations will be performed on whatever scale circumstances may require; effect could be given to this stipulation by transforming into a recommendation the obligatory provision in paragraph (*g*) of Article 27 of the Committee's text. Consequently, the Sub-Committee, of the Health Committee, in order to give satisfaction to the Mixed Sub-Committee, proposes to transform the obligation into a recommendation by adding at the end of Article 20 the following paragraph: "It is recommended that crews, passengers and persons employed in the health supervision service or in duties connected with fluvial navigation should be subjected to preventive vaccination".

The Sub-Committee of the Health Committee further proposes to amend the wording of Article 21 as follows: "A health certificate similar to the specimen in Appendix 2 shall be issued by the health stations at the request of any person who has been subjected to any of the health measures provided for in the present Convention. Such certificate shall be duly filled in or completed by the health authority or authorities who have applied the measures in question.

"The issue of the certificate referred to in the first paragraph shall be obligatory in the case of any person subjected to health surveillance, and such certificate shall constitute a medical passport."

6. As regards the special question of *plague*, the Mixed Sub-Committee has thought it desirable:

(*a*) to delete paragraph 1 of Article 30 of the Committee's text, as it considered that this paragraph ought rather to be included in the special regulations to be drawn up by individual States, with a view to giving effect to the Convention;

(*b*) to omit Article 31 of the Committee's text, as it regarded this article as a repetition of Article 16 of the new text, corresponding to the last paragraph of Article 14 of the Committee's text.

In my opinion, the first suggestion can be agreed to, provided that the stipulation contained in Article 26 (*c*) of the Committee's text is maintained. The provision contained in Article 31 of the Committee's text cannot, however, as I have already observed, be omitted, in so far as it relates to one particular case, that of "an abnormal mortality occurring among the rats on board". This case requires that special measures should be provided for both in international health conventions

and in the present convention. I should indeed regard it as desirable that the provision in question should be extended to cover the case of the discovery of plague-infected rats.

The Sub-Committee of the Health Committee therefore proposes to insert as Article 28 (new text) Article 31 of the Committee's text, which reads as follows: "In the event of an abnormal mortality occurring among the rats on board, the measures prescribed in paragraphs (*d*), (*e*), and (*f*) of Article 26 of the Mixed Sub-Committee's text shall be carried out".

7. The Mixed Sub-Committee has not seen fit to accept the principle laid down in Article 33 of the Committee's text, whereby vessels coming from or navigating in areas affected by plague or cholera, or vessels on which the hygienic conditions are unsatisfactory, or vessels which have not complied with the formalities required of them, must, even if they do not *prima facie* come within the provisions of Articles 29 and 30 of the same text, be treated as if they were in the condition contemplated in those articles.

The Mixed Sub-Committee is of opinion that this stipulation has no practical value. My own view, however, is that vessels on which the hygienic conditions are unsatisfactory should without question be subjected to special health surveillance.

The Sub-Committee of the Health Committee therefore proposes to insert under the designation "Article 23" the following provision: "Vessels on which the hygienic conditions are unsatisfactory shall be subjected to special health surveillance."

* * *

Apart from the foregoing observations, to which I would draw the Committee's attention, I am of opinion that the draft as revised by the Mixed Sub-Committee may as a whole be approved.

Annex 18.

WORK OF THE HEALTH SECTION OF THE INTERNATIONAL LABOUR OFFICE.

Report by Dr. Carozzi submitted to the Committee on February 20th, 1924.

January 12th, 1924.

I have the honour to submit to the Health Committee a supplementary report in addition to the report on the work of the Health Section of the International Labour Office which was submitted to it at the meeting of May 26th, 1923. Since that date the Health Section has mainly devoted itself to the following work:

1. Preparation of a publication on industrial health, to be issued under the title "Occupation and Health.
2. Anthrax statistics.
3. List of fatigue tests.

1. *Occupation and Health.*

A number of articles revised by the members of the Advisory Committee on Industrial Hygiene of the International Labour Office, or by other experts, will be ready for publication in the next few months. The articles in question deal with carbon monoxide, benzene, mercury, mercury mines, compounds of mercury, hair-cutting for felthat-making, methyl bromide, prussic acid and anthrax. Articles have also been received from external contributors on diamond cutting, breweries, rubber, nickel carbonyl, felt hats, nitro-cellulose, irritant woods, superphosphates, fulminate of mercury, paraffin and metal polishing. These articles will be published as soon as they have been revised by the members of the Advisory Committee on Industrial Hygiene, and any necessary alterations made by their authors. Several other contributors have promised to send their articles during the first half of 1924.

We have at present about 40 contributors, but hope to have 20 more later. In this way we shall obtain about 100 articles. The favourable way in which our proposed publication has beed received by experts, and the numerous requests for information which we constantly receive, lean us to hope that the publication will be completely successful.

2. *Anthrax Statistics.*

Statistics of the risk of anthrax infection in various industries are periodically published in the *International Labour Review* (see Vol. VIII, No. 2, August 1923; Vol. VIII, No. 5, November 1923;

Vol. VIII, No. 6, December 1923). Statistics relating to the following countries have already been published: Austria, Denmark, Germany, Italy, Netherlands, Poland, Roumania and Sweden. Statistics for the Argentine have also been received, and we are awaiting supplementary information on Great Britain and France. The series will shortly be completed. The risk of anthrax in the hide and skin industry is dealt with at the end of the present report.

3. *List of Fatigue Tests.*

The preparation of this list has involved lengthy and detailed research. At the suggestion of the Industrial Fatigue Research Board of Great Britain, the Health Section is considering the possibility of centralising information on the scientific movement for the study of fatigue in various countries.

4. *Various.*

At the request of the competent section, the Health Section has also drawn up a note on the question of the extension to industrial diseases of legislation on workmen's compensation for accidents. This question may perhaps be placed on the agenda of the 1925 Conference. The Health Section has also made an English translation of its publication on industrial lighting. It may be hoped that the English edition will be as well received as the French, thanks to the kind assistance of Mr. L. Gaster, Secretary of the Illuminating Engineering Society of London, who has not only verified the technical terms employed but has modified certain passages of the text in order to make them correspond better to British mentality.

The Health Section is now engaged in revising the provisional report on medical factory inspection which it submitted to the last Conference. The revision is being carried out on the basis of the additional information supplied either by the Governments or the medical inspectors. Although the study of the question is rendered more difficult by its presentation in a comparative report, this form has been considered preferable, because it shows the practical utility of the different systems of inspection more clearly than would be possible if each country were treated separately.

Reference should also be made to the bibliographical notes on industrial hygiene with which the Committee is already acquainted. Four numbers containing 2,000 notes were published in 1923. No. 5 is in course of preparation. As the Health Section has received a number of enquiries concerning cinematograph films which are of interest in connection with labour questions, it has for some time been engaged in drawing up a catalogue of such films. The first list appeared in No. 3 of the bibliographical notes.

Advisory Committee on Industrial Hygiene.

The Advisory Committee on Industrial Hygiene of the International Labour Office, which met at Geneva last September, adopted certain resolutions on the two items on its agenda. In the first place, after a full discussion, it approved the scheme drawn up by the Health Section for its publication on "Industrial Hygiene".

The Advisory Committee laid down suggestions for the best method of carrying out the resolution of the London meeting of the Anthrax Committee on the risk of anthrax in the hide and skin industry, and for the organisation of research work by the International Labour Office and the Health Committee of the League of Nations. The resolution adopted was as follows:

> "The Advisory Committee on Industrial Hygiene considers that the most effective method of securing the success of the work of research would be the constitution of national committees to work under the general direction of the Health Committee of the League of Nations. The members might with advantage be appointed after consultation between the Health Committee of the League of Nations and those Government departments which in each country are responsible for the administration of the Factory Acts."

We consider that the best way of carrying out this work would be to constitute a Mixed Sub-Committee of six members to centralise the work. The Committee would include three members of the Health Committee of the League of Nations and three members of the Advisory Committee on Industrial Hygiene of the International Labour Office. The Chief of the Health Section of the International Labour Office and a representative of the Health Section of the Secretariat of the League of Nations would act as secretaries of the Mixed Sub-Committee.

It would be the duty of the Mixed Sub-Committee to undertake, direct and co-ordinate the entire work of research. It would take the necessary action and lay down essential guiding principles; it would encourage the institution and assist in the organisation of national committees in the various countries taking part in the work of research. The national committees would consist of

(*a*) representatives of the public health authorities of the country;

(*b*) members of the medical factory inspection services (particularly members of the Advisory Committee on Industrial Hygiene);

(*c*) representatives of organisations of employers in the hide and skin industries, who should be selected for their capacity to give information on the technical requirements of the industry;

(*d*) representatives of the organisations of workers in the hide and skin industries, who should be selected on account of their capacity to give information on the dangers arising out of the handling of hides and skins;
(*e*) expert representatives of bacteriological laboratories, and government, employers', or private institutions for research into questions affecting tanneries.

The Mixed Sub-Committee would also test the methods of disinfection which have been proposed. The main outlines of its work might be as follows:

(*a*) Laboratory research for the purpose of studying the characteristics of the various types of anthrax culture used for experiments; the standardisation of methods of disinfection, and methods of research and tests.
(*b*) Experiments in factories. In these experiments it is also necessary to standardise the method of artificially infecting hides and skins to be used in disinfection tests when it is not possible to obtain naturally infected skins.

The Mixed Sub-Committee would collect all the information required concerning the method proposed, and would obtain detailed information from inventors before trying experiments with the different processes.

The Mixed Sub-Committee would also test the industrial application of methods of disinfection and would study their results from the technical, economic, and bacteriological point of view, as well as the conditions in which they could be applied.

If the various methods of research mentioned above are applied simultaneously, it will be possible to reach definite conclusions and to recommend certain methods of disinfection.

It should also be pointed out that the Committee which met in London adopted a resolution recommending that the question of the prevention of anthrax among animals and the protection of agricultural workers should be jointly studied by the International Labour Office and the International Institute of Agriculture at Rome.

The Advisory Agricultural Committee of the International Labour Office, which included experts representing both bodies, decided at its last session in August 1923 that the International Institute of Agriculture at Rome should be asked to study this question. The Institute was requested to ask its General Assembly at its next session to empower it to study the subject. The General Assembly meets in Rome next June, and no decision will be taken until that time.

Annex 19. C. H. 22 (3).

RULES OF PROCEDURE OF THE HEALTH COMMITTEE AS ADOPTED ON FEBRUARY 20th, 1924[1].

Article 1.

The Health Committee shall be constituted, and shall exercise its powers, in conformity with the provisions of the Council resolutions of July 7th, 1923, and of the Assembly resolutions of September 15th, 1923.

Article 2.

The Committee shall elect from among its members a President, who shall hold office for the period for which the Committee has been appointed and until the appointment of the succeeding President.

The President of the Advisory Council shall *ex officio* be a Vice-President. Two other Vice-Presidents shall be elected by the Committee for a period of one year. They shall not be re-eligible during the term of office of the Committee.

The Committee shall hold at least two sessions each year, ordinarily in April and October, the dates being fixed after consultation between the President of the Committee and the President of the Advisory Council.

Article 3.

The President shall convene the Committee. He shall be under the obligation to do so if the Council of the League of Nations so decide, or if not less that seven members of the Committee request that a meeting be held.

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[1] The following documents shall be attached as a preamble to the Articles of the Rules of Procedure of the Health Committee:
1. Article 23 of the Covenant of the League of Nations.
2. The resolutions adopted by the Assembly on December 10th, 1920, regarding the establishment and working of the technical organisations of the League of Nations.
3. Scheme for the Permanent Health Organisation of the League of Nations, drawn up by the Special Mixed Committee (June 1923).
4. The Council resolutions of July 7th, 1923, and the Assembly resolutions of September 15th, 1923.

Notices of meetings shall be sent out by the Secretary-General of the League of Nations and, except in cases of urgency, shall be despatched at least one month before the beginning of the session.

Article 4.

The agenda of the session shall be attached to the notices.

Any member of the Committee may notify the Secretariat that he proposes to ask for the inclusion of a particular question in the agenda of the session. The Committee shall decide as to the inclusion of such question in its agenda by a two-thirds majority of the members present.

In the course of a session the Committee may also decide by a two-thirds majority of the members present to add a question to its agenda.

The agenda of the Committee shall in all cases be communicated to the Council of the League of Nations in conformity with the Assembly resolution of December 19th, 1920.

Article 5.

The Medical Director's reports (Article 12) and any reports concerning questions placed on the agenda of the sessions of the Committee shall, so far as possible, be sent to the members at least a fortnight before the opening of the session.

Article 6.

The reports of the Medical Director to the Health Committee must be approved by the Committee, and such approval must be recorded in the Minutes of the session.

Article 7.

All decisions of the Committee, with the exception of those referred to in Article 4, shall be taken by a majority of the members present at the meeting.

If the voting should be equal, the proposal shall be regarded as rejected.

Any reasoned statement of opinion by a minority consisting of one or more members of the Committee shall, if the minority in question so desires, be inserted in the minutes and communicated to the Council together with the resolutions which have been adopted.

Article 8.

The Medical Director shall transmit to the Secretary-General the resolutions adopted by the Health Committee and the Minutes of the meetings.

The Minutes shall be printed and circulated as rapidly as possible.

Article 9.

The Committee may obtain the assistance of experts, in accordance with the provisions of the Council resolution of July 7th, 1923, approved by the Assembly on September 15th, 1923.

Such experts shall be appointed directly by the Committee, which may, if it sees fit, request one or more Governments to suggest persons possessing the necessary qualifications.

Article 10.

The Committee or, in cases of urgency arising in the intervals between sessions, the President, may appoint for the purpose of considering a series of cognate questions, or a single specified question: (1) sub-committees holding office for the duration of a single session; (2) committees to meet in the intervals between sessions; (3) committees composed exclusively of experts.

In the first two cases the committees may include experts.

The experts shall be appointed either by the Health Committee or, in the event of an urgent request being made by a committee ("commission") in the interval between the sessions of the Health Committee, by the President.

If a committee is appointed by the President, notice shall immediately be given to all the members of the Health Committee.

The decision of the Health Committee or of the President, whereby a sub-committee or committee is appointed, shall define its powers and composition.

The reports and proposals of sub-committees and committees shall be brought as speedily as possible to the notice of the members of the Health Committee and shall be submitted for decision to the latter at its next session or, in urgent cases, to the President.

Committees shall be convened by their Chairmen through the intermediary of the Secretary-General of the League of Nations.

Article 11.

It shall be the duty of the Health Section of the Secretariat of the League of Nations to make such arrangements as may be necessary for the work of sub-committees and committees and for the examination of questions placed on their agenda, and to carry out the technical work involved by any decisions taken by these bodies within the limits of their competence.

Committees, including committees of experts, may, if they see fit, authorise their members to undertake, on their own responsibility and in their respective countries, such researches and investigations as may be required for the work of the committees concerned.

In the event of expenditure being entailed by such researches and investigations, each committee may grant advances to its members within limits approved by the Health Committee and after agreement with the Secretary-General.

If a question which is placed on the agenda of a sub-committee or committee has not already been placed on the agenda of the Health Committee, the fact shall be notified by the President of the latter to the Council of the League of Nations and to the Health Committee, in accordance with the Assembly resolution of December 10th, 1920.

Article 12.

In the intervals between the Committee's sessions the Medical Director shall keep the President regularly informed of the progress of the work and of any proposals received by him. He shall draw up annually a general report on the work of the Health Organisation, and this report shall be submitted to the Health Committee in accordance with the provisions of Articles 5 and 6. If it is necessary to take measures involving a question of principle, the Medical Director shall consult the President of the Committee and shall only take action when his consent in writing has been obtained.

Article 13.

The President shall decide what correspondence shall be communicated to all members.

Article 14.

The present rules of procedure may be modified, in the course of any session, by a majority of the members present.

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and the Members of the League.]

C. 213. M. 69. 1924. III.

Geneva, May 17th, 1924.

LEAGUE OF NATIONS

HEALTH COMMITTEE

MINUTES OF THE SECOND SESSION

held at Paris from Wednesday, May 7th, to Saturday, May 10th, 1924.

LIST OF MEMBERS OF THE COMMITTEE

Dr Th. MADSEN, *President,*	Director of the State Serum Institute, Copenhagen.
M. O. VELGHE, *Vice-President,*	Director-General of the Health Department at the Ministry of the Interior and of Health, Brussels.
Sir George BUCHANAN, C.B., M.D., *Vice-President,*	Senior Medical Officer of the Ministry of Health, London.
Surgeon-General H. S. CUMMING, *Vice-President,*	Director-General of the United States Public Health Service, Washington.
Professor Léon BERNARD,	Professor of Hygiene at the Faculty of Medicine of the University of Paris.
Dr H. CARRIÈRE,	Director of the Federal Health Department, Berne.
Dr CHODZKO,	Former Polish Minister of Health.
Dr JITTA,	President of the Health Council of the Netherlands, The Hague.
Professor Ricardo JORGE,	Director-General of Public Health, Lisbon.
Dr M. TSURUMI	Representative of the Japanese Public Health Service.
Dr A. LUTRARIO,	Director-General of the Health Department at the Ministry of the Interior, Rome.
Dr P. MIMBELA,	Professor at the Faculty of Medicine, Lima.
Dr NOCHT,	Director of the Institute for Tropical Diseases, Hamburg.
Professor Donato OTTOLENGHI,	Professor of Hygiene at the Royal University, Bologna.
Professor Gustavo PITTALUGA,	Catedratico de la Facultad de Medicina, Madrid.
Dr L. RAYNAUD,	Inspecteur général des Services d'hygiène d'Algérie, Algiers.
Dr RAJCHMAN,	The Medical Director, acted as Secretary of the Committee.

Absent:

Dr Carlos CHAGAS,	Director of the Instituto Oswaldo Cruz, Rio de Janeiro.
Dr A. GRANVILLE,	President of the Conseil Sanitaire, maritime et quarantenaire, Alexandria.
Dr Alice HAMILTON,	Associate-Professor of Industrial Hygiene, Harvard Medical School, Boston.

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FIRST MEETING

Held at Paris on Wednesday, May 7th, 1924, at 3 p.m.

Present: All the members of the Committee except Dr. Alice Hamilton, Dr. Chagas and Dr. Granville.

60. **Opening of the Session.**

The PRESIDENT, in opening the session, welcomed, in the name of the Committee, Surgeon-General Cumming and Dr. Tsurumi. He was also happy to inform the Committee that Dr. Granville, who had been prevented from attending the last session owing to ill health, was now considerably better, though he was still not sufficiently well to resume his duties on the Committee.

61. **Agenda of the Session.**

The Committee considered the draft agenda and decided to add the following four additional items:

1. Representation of the Red Cross Societies on the Committee;
2. Report of the Opium Commission;
3. Report of the Malaria Commission;
4. Standardisation of sera and biological products: Report by the President.

The agenda, thus amended, was approved (Annex 20).

62. **Representation of the Red Cross Societies on the Committee.**

Dr. RAJCHMAN read a letter from the Director-General of the League of Red Cross Societies stating that the Mixed Committee of the International Committee of the Red Cross and the League of Red Cross Societies desired to propose the nomination of Dr. Jean Cantacuzène, Professor of the University of Bucarest, member of the Office international d'Hygiène publique and member of the Central Committee of the Roumanian Red Cross, to represent the Mixed Committee on the Health Committee.

Sir George BUCHANAN said that he was a little surprised at the choice of the Mixed Committee. He had always imagined that that Committee would suggest as its representative a person familiar with the work of the League of Red Cross Societies or of the International Committee of the Red Cross — that was to say, one of the principal officers of those organisations who could speak with authority, knowledge and experience of the manner in which the different Red Cross Societies and the Central Office were carrying out their programmes and what their policy was. The Mixed Committee had evidently been unable to agree and had therefore compromised on the choice of a distinguished hygienist. Though he had no personal objections to Dr. Cantacuzène, whose qualifications were well known, he nevertheless considered that, in the circumstances, the views of the Health Committee might have been obtained informally beforehand as regards the selection of the distinguished hygienist required. At the last session he had emphasised the weakness of the Committee in that it did not include a representative of the British Dominions or of India. As it seemed to be merely a question of finding a distinguished hygienist connected with the Red Cross, it would have been perfectly possible, if the position had been known, to have suggested such a person from one of the British Dominions or India.

He suggested that the question should be adjourned until the next session in order that the Committee might have time to consult the Red Cross Societies.

The PRESIDENT agreed with Sir George Buchanan in thinking that the Committee was incomplete without a representative of the British Dominions or of India. As, however, the League of Red Cross Societies and the International Committee of the Red Cross had been left entirely free to choose whatever candidate they desired, and as, moreover, their choice had fallen upon so distinguished a person as Dr. Cantacuzène, who had played a very prominent part in the activities of the Roumanian Red Cross Society, he felt that it would be impossible for the Committee to challenge this decision.

After a short exchange of views between Sir George BUCHANAN, M. VELGHE and the PRESIDENT, *the appointment of Dr. Cantacuzène was approved by the Committee,* which invited him to attend its next meeting.

63. **Establishment of an Epidemiological Bureau for the Far East: Observations received from Governments.**

Dr. RAJCHMAN informed the Committee that four Governments had replied to the Secretary-General's letter concerning the proposed establishment of the Bureau. He recalled the fact that the Committee had decided at its last session to send a letter to the Far Eastern Governments, together with Dr. Norman White's report, requesting their observations. These Governments had also been asked by a separate letter to state what port should, in their opinion, be chosen as the headquarters of the Bureau.

The Chinese Government had replied that it agreed to the establishment of a Bureau, but it made no mention of the port in which it considered that it should be set up.

The Portuguese Government had replied accepting the establishment of the Bureau in question, provided that no increased financial charges would be incurred. As regarded the port in which that Bureau should be established, the Portuguese Government had expressed no opinion but had instructed Professor Jorge to examine the question and to support any proposal which seemed to give the best results.

The Dutch Government had replied that it had not been possible to consult the Government of the Dutch Indies, and it therefore hoped that the decision regarding the port would be postponed.

The French Government had replied that it accepted, in principle, the proposed establishment of a Bureau, but it could take no further official decision until the exact functions and duties of that organisation, as well as the financial obligations falling upon the different countries, had been defined. The French Government also desired to know what countries had been invited to participate in the establishment of this Bureau. As regarded the question of the port, it was considered that a port like Cap St. Jacques, near to Saigon, ought to be chosen. This port, being between Singapore and Hongkong, possessed a central geographical situation and also the strongest wireless station in that part of the world, by which means it would be possible to communicate health information to the Governments. It was a very important medical centre, the headquarters of the Director of the Health Service of Cochin-China and of the Vice-President of the Society of Tropical Medicine of the Far East, whose collaboration would prove of the greatest use.

Dr. TSURUMI said that the Japanese Government agreed to the proposed establishment of the Bureau and thought that Singapore ought to be the port chosen. His Government desired further information regarding the duties of the Bureau.

Sir George BUCHANAN said that the British Ministry of Health had communicated the proposal to the Colonial Office, pointing out that it was divided into two parts: (1) the proposal that a Bureau should be established, and (2) the proposed Far East chapter in the Convention with which the question of a Bureau was associated. The Ministry of Health had asked for replies to both these questions.

With regard to the port in which the Bureau should be established, the Ministry of Health had suggested that, in view of Dr. Norman White's report and in view of geographical considerations, Singapore should receive special consideration. The Colonial Office had communicated with the various Colonial Governments and had received replies from four. The Straits Settlements had agreed that Singapore was the most suitable place, as also had the Governor of Hongkong and the Governor of Ceylon. The Board of Directors of the British North Borneo Company had also agreed to Singapore or any other place acceptable to the Governments of British Possessions in the Far East. By courtesy of the India Office, Sir George Buchanan had been informed that the Government of India was replying to the League to the effect that it had no objections to the scheme as one for an intelligence bureau only, nor to the choice of Singapore, provided that no financial obligations would be placed on the Indian Government by the adoption of the scheme. He understood that the phrase "financial obligations" covered telegraphic expenses in connection with the Bureau. He should have added that the Colonial Secretary, on behalf of the British Colonies and in view of the replies received from the Colonies, himself agreed to the choice of Singapore. It could therefore be said that Singapore was the combined choice of the British Possessions in the Far East.

Surgeon-General CUMMING said that the United States Government had not yet had time to consider the proposal, but, as regards the establishment of an Epidemiological Intelligence Bureau, he thought it would raise no objection. The question of a separate Sanitary Convention for the Far East, however, would have to be carefully examined. He desired to draw the attention of the Committee to the fact that separate sanitary conventions for different parts of the world might imperil the international character of the Committee and would be a step towards decentralisation.

The PRESIDENT proposed that the remainder of the discussion should be postponed until the Commission which was examining the question presented a report.

Dr. JITTA recalled the fact that, according to a telegram from his Government, the reply from the Dutch Indies had not yet arrived. His Government recognised that an Epidemiological Intelligence Bureau would be of great use, and it would doubtless raise no objections, except on the score of expense.

With regard to the choice of a port, the Committee had received proposals from Great Britain, France and other countries. It would be better to adjourn the question until the next session.

Dr. RAJCHMAN reminded the Committee that the final decision regarding this matter lay with the Council, which was to meet on June 10th. He thought, therefore, that a definite proposal should be laid before it on that date. The Rockefeller Foundation, whose assistance had been requested, would take a decision on May 26th. Were the Committee, therefore, to adjourn the discussion until the next session, the Council would be unable to take a decision before the end of the year. The Netherlands Government might be consulted by telegram, since other Governments had now replied. If necessary, the Commission appointed to examine the question could hold a special session before June 10th. The organisation of the Bureau would depend on the port which was chosen, and he therefore proposed that the Commission should immediately undertake the examination of this question and make a report during the present session.

Sir George BUCHANAN asked whether it would not be desirable to give very precise instructions to the Commission.

Dr. RAJCHMAN recalled the terms of reference of the Commission.

On the proposal of the PRESIDENT, *it was decided to appoint* Surgeon-General CUMMING *and* Dr. TSURUMI *as additional members of the Commission.* The Committee requested the Commission to examine the question and to submit a report.

64. **Appointment of Three European Doctors as Health Advisors to the Turkish Government.**

Sir George BUCHANAN submitted that, though no answer had been received from the Turkish Government since the last session, the Committee might consider whether there was any method of hastening matters. At the previous session, Professor Pittaluga had suggested that a representative of the Committee might be sent to Constantinople and to Angora to undertake negotiations on the spot. The Treaty of Lausanne, by the terms of which the experts were to be appointed, had not yet been ratified by the Great Powers, and the Committee would presumably have to wait for ratification before taking any definite steps. As, however, it was to be anticipated that the ratification would take place shortly, the Committee should perhaps discuss immediately what action could then be taken.

Professor Léon BERNARD agreed with Sir George Buchanan.

Dr. LUTRARIO also agreed with Sir George Buchanan. It was most necessary for the Committee to do all that it could to obtain a reply from the Turkish Government, so that the appointment of the experts would not be delayed. It was important that the funds which appeared to be available should be used — acting on the advice of the three experts to be appointed — for the restoration of the quarantine stations which had been abolished during the war. These funds represented what remained of the money which had been at the disposal of the Health administration of the former Superior Health Council at Constantinople.

Dr. RAJCHMAN pointed out that the Treaty had not yet been ratified and the Committee would therefore have to wait for ratification before appointing the experts. The Turkish Government, however, had already entered into closer relationship with the League, and an exchange of epidemiological intelligence with Turkey had taken place. It was necessary for the Committee, however, to know the present situation in Turkey, and it might perhaps be advisable to consider the suggestion as to the despatch of a representative to Constantinople and Angora to obtain definite information as to the general epidemic and sanitary situation. The Turkish Government further desired to avail itself of the financial help of the Rockefeller Foundation in order to re-establish its health organisations.

Professor PITTALUGA was glad to see that the Committee appeared to favour the proposal which he had made at the preceding session. As soon as the Treaty was ratified, steps could be taken officially to approach the Turkish Government, and the Medical Director could be instructed to send a representative to Turkey when the time appeared suitable and if funds permitted.

Sir George BUCHANAN agreed. The Treaty, however, would have to be ratified before the representative was chosen. It would be desirable, if the President agreed, to ask him in due course to consult one or two members of the Committee who were specially interested in the question, before the appointment was made.

The Committee adopted the proposals of Professor Pittaluga and Sir George Buchanan.

65. **Report of the Medical Director.**

Dr. RAJCHMAN made a verbal report (Annex 21).

Professor Léon BERNARD congratulated Dr. Rajchman on his admirable report. With regard to the interchange visits to France, notably that concerning tuberculosis, he agreed that the duration of the visit had been too short and he hoped that the next one would be longer. The visitors, however, had been very satisfied with what they had seen.

He enquired whether the Medical Director had received any answers from Governments concerning the important question of laboratory control. With regard to the Commission on Public Health Instruction, of which he was Chairman, he hoped that it might be possible for the Committee to appoint additional experts, such as Sir George Newman and Dr. Andrew Balfour, a Yugoslav and possibly a Russian expert also, with a view to another meeting of the Commission later.

He desired to know how the Kingdom of the Serbs, Croats and Slovenes had succeeded in reorganising, in such a striking way, its health organisation. This country had been ravaged by war and yet it had apparently found sufficient funds to enable it to set up what was evidently a very efficient and complete organisation.

The Committee decided that the question of the experts to be attached to the Commission on Public Health Instruction should be settled by the President and Professor Léon Bernard.

Professor PITTALUGA wished to mention again the question of laboratory control, especially in regard to those laboratories engaged on the sero-diagnosis of syphilis. In his view, it was very important that any decisions regarding laboratory control should be distributed to the Governments as soon as possible.

Dr. CARRIÈRE wished to make not so much a criticism as certain observations of a practical kind regarding some of the interchanges; these observations were the result of the visits made by the specialists in tuberculosis. Within a period of about three months eight countries had been visited, and he considered this number too great. Under such conditions it was not possible to allow of sufficient time being spent in each country, and those organising the visits were therefore obliged either to overload the programme or to exclude from it interesting institutions. On the other hand, such a rapid review of countries and institutions, which was rather kaleidoscopic in effect, would almost certainly leave some confusion in the minds of the visitors, apart from their very marked fatigue which Dr. Carrière had noticed on their arrival in Switzerland.

He considered that, in the interests of this excellent system of interchanges itself, it would be desirable, if not to shorten the duration of each visit, at least to reduce the number of countries visited during an interchange of specialists, for it was only of the latter that he had wished to speak. The results that it was hoped to obtain from these visits would, in his opinion, be much better if such a modification were made.

Dr. JITTA agreed with Dr. Carrière. The doctors who had arrived from the Netherlands had been very tired. This also applied to the school hygiene specialists, who had remarked that they had been shown too often similar institutions.

Dr. RAJCHMAN agreed in thinking that the programme of interchange visits must be lightened He could not understand, however, why the school hygiene specialists had been tired, for they had not been faced with a very heavy programme. The complaints as to the fatigue of the visitors were often exaggerated, but what the medical officers had in mind was the fact that they saw similar organisations in the different countries.

Professor Léon BERNARD thought that the number of countries should be reduced, but not the daily hours of work. If many countries were visited, there was a tendency to overload the programme; too much time was spent in the actual travelling; the different types of men, the different things seen and the difference in language were also potent factors in connection with the fatigue of the participants.

Sir George BUCHANAN said that the visitors who had taken part in the interchange visit to Great Britain had worked very hard and had not appeared to be fatigued at the end of their visit.

Concerning Dr. Rajchman's reference to the Commissions which had met just before the present session, he enquired what would be the most useful procedure for the Committee to follow with regard to their reports. The report of the Opium Commissions, for instance, was of great interest and would, in his opinion, have to be considered beforehand by the members individually before any decision could be taken. This applied also to the Malaria Commission. Would it be possible, therefore, either for the reports of the Commissions to be distributed before discussion in the full Committee or else for a statement regarding the work of each Commission to be made and the Committee's decision postponed until a future day to enable members to consider that statement ?

With regard to the by-law requiring the President to authorise the communication of correspondence to all members, Sir George Buchanan hoped it might be made a general rule that every member of the Committee would be informed when any Commission was meeting, even if he were not a member of that Commission, and, if possible, of the agenda.

M. VELGHE said that those taking part in the interchange visit to Belgium, when the question of tuberculosis was examined, had appeared a little fatigued at the end, as the duration of the visit, as originally planned, had had to be shortened; the school hygiene specialists, however, had had plenty of time in which to do their work. A careful preparation for the interchange visit would greatly reduce the fatigue of the participants. Accordingly, those countries to which an interchange visit was to be made should be able to prepare for them several months beforehand, particularly as regards the drafting and printing of the documents to be sent to the visitors.

Dr. RAJCHMAN replied to the various comments upon his report:

(1) As regards the remarks made by Professor Pittaluga, the decisions of the Health Committee taken at its last session had been sent to all the Governments represented on the Council fifteen days before the meeting of the Council which had taken place on March 10th.

(2) With regard to Dr. Stampar's work in the Kingdom of the Serbs, Croats and Slovenes, to which Professor Léon Bernard had referred, Dr. Stampar had received 300,000,000 dinars

for the year 1924, and this budgetary provision had been regarded as a minimum sum. He had obtained this money by means of intensive practical activity coupled with public health propaganda; the cinema had been employed with great effect and the enthusiasm of the peasant classes had been aroused. The Government had therefore been induced to spend considerable sums on health organisation. Further, the Kingdom of the Serbs, Croats and Slovenes was receiving reparations in kind from Germany and had obtained large quantities of sanitary material of the very best description from that country.

(3) With regard to dates of meetings of the Commissions, it depended upon circumstances whether it was possible to inform all the members of the Committee. The last meeting of the Opium Commission, for instance, had had to be convened by telegram and telephone owing to the fact that the Opium Preparatory Committee had only submitted a request for information exactly seven days previously. Reports of the Commissions were inevitably a little late. For financial reasons, the Commissions had to meet as often as possible during the full session of the Committee. But, of course, all the rules of procedure would be strictly adhered to and exceptions could only be made in very unusual circumstances.

(4) Concerning interchanges, it was clear that preparations had to be made many months before and he reminded the Committee that it had adopted last February a programme for 1925; arrangements were already being made as to the details of this programme.

Sir George BUCHANAN wished to emphasise the fact that he had regarded the matter from the general point of view and that the question was one of principle. It was important that each member of the Committee should have complete information regarding the work of the various Commissions.

The PRESIDENT said that the reports on malaria and opium would doubtless be circulated before the end of the session.

Dr. RAJCHMAN added that the Minutes of the Malaria Commission could be communicated to the members of the Health Committee for their information.

66. **Budget of the Committee: Credits for Interchange Visits.**

The Committee instructed the Bureau to draw up a draft resolution requesting an increase of credits for interchange visits.

67. **The Question of Leprosy.**

The PRESIDENT asked Dr. Marchoux to make a statement regarding the third Leprosy Conference.

Dr. MARCHOUX reminded the Committee that the first Conference on Leprosy had met in Berlin in 1897 and the second at Bergen. The third International Leprosy Conference had sat at Strasburg from July 28th to 31st, 1923. Thirty-four States had been represented, and Dr. Rulot had represented the Health Section of the League. The resolutions and recommendations of the Conference had been transmitted to the League. A permanent Committee had been set up at Bergen, but it had never assumed its duties. It appeared that the League of Nations, which was a living organisation, could fulfil the task which had been entrusted to this permanent Committee. The Conference had requested the League to draw up general statistics on leprosy. The number of cases of leprosy was more considerable than was thought when Europe only was taken into consideration. Leprosy was prevalent in certain countries, for example, in Paraguay, where it was worse than tuberculosis. There were several million cases of leprosy in the world.

The second recommendation of the Conference concerned the establishment of an information bureau to which each doctor treating leprosy could have access.

The Conference had finally desired the League of Nations to take up the publication of the periodical *Lepra*, which had been published in Germany before the war under the editorship of a professor from Copenhagen. This publication had seemed to the representatives of the States attending the Conference to be of great use, so much so that they had proposed to contribute to the cost of its production.

He thanked the Committee for having given him an opportunity of making known the recommendations of the Conference and he hoped that the Committee, by the decisions which it might take, would enable him to reply to the numerous questions which were put to him daily.

Sir George BUCHANAN thought that this question was a very important one and that time was required for reflection. In his opinion it would be impossible to undertake the publication of the paper referred to above because this would create a precedent. It might, however, be possible to add a page or a chapter to the *Epidemiological Report* and to the annual report published by the Health Section. Further, a specially qualified person could be appointed to prepare a monograph on the question of leprosy, if the Committee so decided, later on.

Dr. RAJCHMAN agreed with Sir George Buchanan that it would be easy to add statistics regarding leprosy to the quarterly statements of the *Epidemiological Report*. Mr. Sydenstricker had begun an examination of the statistics, and a preliminary enquiry on the methods of diagnosis, etc., could be undertaken in respect of those countries where notification of leprosy was obligatory. The Health Section could undertake this work. As Sir George Buchanan had said, it was impossible to think of subsidising a periodical. The Health Committee, however, might be able to publish a monograph.

On the proposal of Sir George BUCHANAN, *the Committee decided that the Medical Director should publish statistical information concerning leprosy and that the publication of a monograph written by a duly qualified person should be taken into consideration later.*

Dr. LUTRARIO informed the Committee that there were numerous cases of leprosy in Italy, where notification was compulsory. In view of the large amount of emigration between Italy and Latin America, it had become necessary to draw up statistics for all the districts of Italy. The investigation of these statistics was not yet finished, but he would submit a memorandum on the subject to the Committee at a later date.

SECOND MEETING

Held at Paris on Thursday, May 8th, 1924, at 10 a.m.

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68. Representation of the Red Cross Societies on the Committee: Letter from Dr Cantacuzène.

The PRESIDENT read a letter from Dr. Cantacuzène thanking the Health Committee for proposing his name to the Council for membership of the Committee. Dr. Cantacuzène would always endeavour to be a most devoted collaborator in the work of the Committee, of which he would be proud to be a member.

69. Dutch Proposal concerning Quarantine Clearance of Ships.

Dr. JITTA explained his memorandum (Annex 22). The Netherlands Government had asked the League whether it would be possible to draw up an International Convention concerning the sanitary measures to be taken in ports. To obtain a universal standard for such measures, control by the League would be necessary. The Netherlands Government realised, however, that that control would be difficult to obtain owing to the fact that many Governments would not agree to any form of international control in what was a domestic matter. The question was so important, however, that, if a general convention were impossible, the League could perhaps recommend the adoption of special agreements between neighbouring States concerning the health measures in their ports. A convention between France and Italy regarding the Mediterranean ports already existed.

The League might perhaps perform three functions; (1) it could establish the general rules of sanitary control which could be enforced in ports; (2) countries might consent to attribute a right of supervision and control to some existing international authority such as the League; (3) any disputes arising from the application of sanitary measures might perhaps be referred to an Arbitration Committee appointed by the League.

Despite the difficulties attendant upon it, he hoped that this important question would not be adjourned. A preliminary step could be taken by recommending the adoption of special agreements.

M. VELGHE agreed with Dr. Jitta. In the Sanitary Convention of 1912 an article (Article 41) had been introduced stipulating that countries, in applying their health measures to ships arriving at their ports, should take into consideration the health measures which had been taken in the ports of the country of origin or the ports of call. An international organisation and an international control were, however, impossible, but it would be easy to carry out the Dutch proposals by means of special agreements between neighbouring States. He was not in favour of a central organ dictating general rules, because it did not seem that such an organisation could be established immediately. Mutual confidence in the sanitary measures taken in the various ports formed the basis of all restrictions as regards the measures to be adopted at the port of arrival. He thought that the Dutch proposal to the effect that the examination of ships should not be compulsory when they had already touched at a port in which the medical control was adequate ought to be more clearly defined. Cases frequently arose, for instance, of a ship arriving at a port which was perfectly equipped from the health point of view, discharging part of its cargo there and being subjected to medical examination. It was impossible, however, when only part of the cargo was discharged for the ship to be adequately subjected to derati-sation. On the arrival of the vessel at its final port of destination, infected rats might be discovered on board which had been overlooked before. For this reason it would be necessary to provide in certain cases for supplementary measures to be taken at the port of arrival.

The Committee should draw up a model convention for the use of States concluding special agreements. Further, the Committee should collect and publish objective descriptions of the sanitary organisation of the different ports. By these means the conclusion of special agreements would be facilitated.

Some countries taxed the medical examination of foreign ships entering their ports and thus derived a source of revenue. This would be one of the points with which special agreements would deal. In conclusion, Dr. Jitta's proposal should be attained by means of special agreements between States.

Dr. LUTRARIO thanked Dr. Jitta for the reference which he had made to him in his memorandum. He was ready to support the principle underlying the Netherlands proposal. It was more important to take proper measures of health control in the port of departure than in the port of arrival, and the more this was done the more ships would be relieved of the inconveniences at present resulting from the strict rules existing in the ports of destination and from the differences between the systems of sanitary control. When, for instance, cholera and plague had raged in Tripoli, the health precautions taken in the ports of Tripoli had been so effective that no single case of cholera or plague had occurred in ships leaving Tripoli. In 1911, when there had been a large wave of emigration from Italy to the United States, considerable numbers of emigrants had come from districts in Italy which had been attacked by a severe outbreak of cholera, when as many as 15,000 cases were recorded. The special sanitary precautions taken at the port of Naples, at which the majority of the emigrants had embarked for America, had been extremely effective — only one case of cholera had occurred. This seemed to him to prove that protection was afforded by enforcing adequate sanitary measures at the port of embarkation, but this practice was not sufficiently widely applied and should be more universally adopted.

Above all, health precautions were necessary in the case of air travel, for persons travelling by this means usually did so because it was speedier than any other, and it would be most unjust to expect them to be held up at their journey's end by having to submit to strict and lengthy sanitary measures of control. He therefore thought that the Committee should begin by recommending special agreements and should proceed to verify the conditions of sanitary control in the various ports. When this had been done, it would be possible to determine those ports in which control was effective.

Sir George BUCHANAN said that the Committee should be grateful to Dr. Jitta for the way in which he had dealt with the problem. The object which the Netherlands Government had in view was a very desirable one. It was undoubtedly necessary to adjust the practice of each country in regard to sanitary control in ports, and it was very necessary, therefore, that the port authorities should know what measures were taken in other countries. Although commerce should not be hindered, it was equally important to prevent the spread of disease. A mutual understanding between two States concerning the health measures taken in their ports tended to remove difficulties and freed commerce from unnecessary restrictions. Special agreements between States might be multiplied with advantage. He was not, however, in favour of the proposal that the Committee should draw up a model convention, for it would be faced with the obvious difficulty that a special agreement depended on local circumstances and was designed to meet local conditions. A model Convention, from its very nature, could not contain any reference to local difficulties.

The Committee could, however, encourage the conclusion of special agreements and could perhaps go further and recommend that in case of disputes the League should act as arbiter. He accordingly desired to submit the following proposal:

> "The Committee considers that it is desirable that special agreements should be concluded between countries to facilitate the practical application of the general sanitary conventions for the benefit of public health administrations and the convenience of commerce. Such agreements are already contemplated by Article 41 of the International Sanitary Convention of 1912. As it may be advantageous, in the preparation of such agreements, to refer all disputes which may arise in connection with their execution to the decision of the League of Nations, the Committee recommends that the League should give favourable consideration to any proposals to that effect which may in future be made by the countries desiring to effect such agreements."

Surgeon-General CUMMING desired to express his admiration of the splendid work done in Italy during the cholera epidemic and also of the effective measures of control taken at the port of Hamburg. He was in entire agreement with Sir George Buchanan and Dr. Jitta on the point that an International Convention adhered to by all States could not at present be contemplated. The agreements had best be made between country and country. He also agreed with Sir George Buchanan in thinking that the Committee could not draw up a model Convention because of the differing local conditions. The United States had an informal agreement with Canada, which would shortly take the form of a Convention.

M. VELGHE was happy to see that the Committee was not desirous of adjourning all consideration of Dr. Jitta's proposal. He thought, however, that the opposition of Sir George Buchanan and Surgeon-General Cumming to his proposal concerning the model Convention was due to a misunderstanding. He did not propose that the Health Committee should draft a *ne varietur* text but that it should examine the practical difficulties which might arise in the conclusion of special agreements, and should endeavour to define general principles which might be followed by all States. The Convention shortly to be concluded between the United States and Canada might perhaps be taken as a model. In his opinion, a Committee such as the Health Committee which included epidemiological experts was best able to examine the problem and to find solutions for the various difficulties.

Article 41 of the International Sanitary Convention of 1912 had not been put into effec- precisely because States had had before them no principles by which to guide their action. The

Health Committee must therefore study the question in detail and should set up a Committee for this purpose, since it appeared to be useless merely to recommend that countries should conclude special agreements without informing them what general lines those agreements should follow.

Professor NOCHT agreed with Dr. Lutrario concerning the importance of taking adequate sanitary measures in the port of departure. As regarded the question of a model Convention, he thought it would be impossible to obtain, by means of a questionnaire, adequate information concerning the sanitary control in ports; answers to questionnaires were invariably unsatisfactory. The Committee would have to obtain a really clear idea of the sanitary installation of ports and also of the spirit in which the sanitary measures were applied.

Personally, he attached little value to the medical examination of a ship on its arrival at a port, for this was a very uncertain means of detecting the presence of an infectious disease. What was important was the medical supervision of that ship during the whole time it remained in the port. The system of health control in ports was, in most countries, bound up so intimately not only with the organisation of the general public health service but also with the spirit in which that service was working that it seemed to him difficult to make the way in which the permanent medical supervision of ships was done during their stay in the different ports the object of an opinion of the Committee.

M. VELGHE explained that his proposal that the Committee should draw up a model Convention meant that the Committee should endeavour to establish the general principles which should be included in special agreements. No special agreements could be concluded unless such principles were established. It would obviously be impossible to obtain adequate information regarding the sanitary control of ports by means of a questionnaire. He considered that the Committee would have to draft an objective description of the health organisation in ports.

Dr. MIMBELA supported Dr. Jitta's proposal. Experience in the Latin-American States had shown that, while a Pan-South American Convention existed, the details of health control as between the neighbouring States had been regulated by special agreements. The medical inspection of ships on arrival was regarded in Latin America as important, but even more important were the measures of disinfection. Special agreements should therefore be concluded in order to ensure the strict application of such measures. He thanked Dr. Lutrario for the measures taken in Italy to control the health of emigrants.

The proposal made by Dr. Jitta had been raised officially by the Netherlands Minister at Berne. He thought that this diplomatic path might be pursued. Perhaps the Netherlands Government would be able to conclude a special agreement with the neighbouring countries. By the conclusion of such an agreement between two States a precedent would be created, and other States would follow the same course.

Dr. JITTA thanked his colleagues for the support they had given to his suggestions. His proposal for adjournment referred to the first suggestion concerning the International Convention. The most essential factor was the conclusion of special agreements between neighbouring countries.

He supported M. Velghe's scheme. The Committee might begin by drawing up model Conventions the adoption of which could be recommended to the different countries. As to the proposal of Sir George Buchanan, he would support it on condition that further measures of a practical nature were undertaken.

Sir George BUCHANAN thanked M. Velghe for his explanations, which did much to help the Committee's discussions. Care, however, must be taken that the conclusion of special agreements and local arrangements did not detract attention from the revision of the general International Sanitary Convention. Special agreements between States could not and ought not to go very far without being based on a generally accepted international rule. If, for example, the Committee did not settle upon a general rule as to what constituted an "infected port" or whether the practice of port sanitary authorities should be based on declaring ports "infected", still more confusion would be the result of a series of special arrangements between individual countries. The same argument applied to "deratisation". Both these questions were in an unsatisfactory state in the Convention of 1912 now in force and both wanted settling (as did many other points) in a revised Convention. Care must be taken that the individual agreements did not postpone the essential agreement on the general principles.

Dr. RAJCHMAN recalled how the question had arisen. The Netherlands Government had submitted it to the Council of the League, which had referred it to the Health Committee. The Commission which had examined it had been unable to arrive at a unanimous agreement and the question had therefore been referred back to the Health Committee. In the meantime, the fourth Assembly had instructed the Health Committee once more to examine the question in view of its importance. Further, the Advisory Committee on Communications and Transit had decided to undertake the examination of this question from its own point of view by means of a Sub-Committee on Maritime Affairs including representatives of Governments and of shipping firms. In these circumstances it seemed impossible for the Health Committee to put the question on one side. Special agreements were not incompatible with an International Convention. The observations made by Dr. Nocht also showed how useful a detailed examination would be. In conclusion, he warmly supported M. Velghe's proposal.

The question had been studied from the legal point of view by the Secretariat, whose collection of documents on the subject might prove of use to the Sub-Committee.

It should not be forgotten that the Health Committee had been established with the object of giving advice to Governments. At this moment, a request for its advice had been received from the Netherlands Government. This question, however, was not one of diplomacy. The only reason why the League of Nations had received this request through the Netherlands Minister at Berne was merely because all communications with the Netherlands Government passed through his hands.

Dr. RAYNAUD referred to Professor Nocht's observations and assured him that there was scarcely a single ship's captain who made an entirely frank declaration. They were, indeed, almost obliged to conceal certain things at all ports possessing quarantine regulations but no service of disinfection. It would be of the greatest use to know how the services of the various ports carried out their work, and with this object in view an enquiry similar to that which had been made by Dr. Norman White in the Far East should be undertaken. Special agreements would prevent the application of useless quarantine regulations.

Dr. TSURUMI pointed out that these questions were particularly important in the Far East, more so even than in Europe. This was proved by the Singapore Congress. He hoped, therefore, that the Commission to be appointed would not neglect this aspect of the question.

Professor Léon BERNARD thought that after the explanations which had been given, especially those of the Medical Director, the Committee was under a moral obligation to continue the examination of the question. There was no contradiction between the proposals of Sir George Buchanan and those of M. Velghe. They could be combined in one resolution to serve as a reply to the Assembly, in which it would be noted that the Committee would continue to examine the question in a spirit which was favourable to the principle of special conventions and with the desire to prepare model conventions. The examination of such conventions as already existed would show the type of convention which should specially be recommended to Governments.

Professor Ricardo JORGE emphasised the importance of medical inspection. Provision should be made in the conventions for punishment for false declarations on the part of captains. As Sir George Buchanan had pointed out, special agreements should be subordinate to an international convention. The proposals of Sir George Buchanan and M. Velghe, between which no contradiction existed, could indeed be combined. Further, Dr. Raynaud's suggestion could be retained. It dealt with the setting on foot of an enquiry into the existing regulations in the various ports with a view to the drafting of a general convention.

Dr. JITTA pointed out to Sir George Buchanan that the International Convention which it was desired to draw up would only contain general principles. It would serve as a basis for special agreements without entering into questions of detail. He supported M. Velghe's proposal as well as that of Dr. Raynaud concerning an enquiry into the regulations existing in ports.

Sir George BUCHANAN repeated that a basis must be found for special agreements and that the existing general Convention had proved to be unsatisfactory. No great progress could be made without recourse to a new general convention. Questions such as the definition of infected ports and the deratisation of ships were of special importance for sea Powers.

On the proposal of the PRESIDENT, *it was decided that* Dr. JITTA, M. VELGHE, Sir George BUCHANAN and Surgeon-General CUMMING *should draft a resolution on this question.*

70. Representation of the Health Committee on the Court of Governors of the School of Hygiene in London.

Dr. RAJCHMAN read the correspondence which had been exchanged between the Secretariat and the British Government since the last session of the Committee. The Health Committee had been asked to assist the School of Hygiene in London by nominating as a member of the Court of Governors a person with wide experience of international medicine and health requirements in the different parts of the world.

Sir George BUCHANAN explained that it had been desired to place the school in question on as broad a basis as possible and that the Governing Body would be entrusted with the task of drawing up the general outline of the School's programme.

On the proposal of the PRESIDENT, the *Committee unanimously decided to appoint* Sir George BUCHANAN *to act in the above capacity.*

Sir George BUCHANAN thanked his colleagues for this mark of their confidence.

71. Work of the Anthrax Commission.

Professor OTTOLENGHI recalled the fact that the Anthrax Commission was composed of three members of the Health Committee and three members appointed by the International Labour Office. The three members of the Health Committee had carried out certain preliminary work and had adopted a resolution proposing primarily the establishment of National Committees in Germany, Great Britain, Belgium, Italy and, perhaps, in Switzerland and the United States. These Committees would include industrial persons who would carry out experiments in factories

in order to examine, from the commercial point of view, the action on the skins of the disinfecting processes proposed, and the skins, on the other hand, would be subjected to bacteriological control in two or more scientific laboratories. It would be necessary to procure for the bacteriological experiments skins infected naturally. On this particular question also, the Commission had had a preliminary discussion.

Dr. RAJCHMAN recalled the fact that a sum of 10,000 Swiss francs had been included in the provisional estimates to cover the expenses of this Commission for the year 1925.

THIRD MEETING

Held at Paris on Friday, May 9th, 1924, at 10 a.m.

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72. Minutes of the First Meeting.

The Minutes of the first meeting were approved, it being understood that members should submit formal amendments to the Health Section as soon as possible.

73. Report of the Malaria Commission.

The PRESIDENT welcomed M. Reverdin, representative of the International Committee of the Red Cross, and M. Humbert, representative of the League of Red Cross Societies, who were attending the meeting of the Committee while the question of malaria was being discussed.

He called upon Dr. Lutrario to submit the report of the Commission.

Dr. LUTRARIO recalled the fact that a report on the work of the Commission (Annex 23), together with the Minutes of two meetings, had been distributed to all the members of the Committee.

The meetings of the Commission had not only been attended by all its members but other members of the Health Committee had shown the greatest interest in its meetings. The Commission had succeeded a preliminary Sub-Committee which had concluded its work by submitting to the Health Committee a very detailed questionnaire, which would make it possible to collect many statistics regarding malaria. The new Commission had been appointed at the preceding session of the Health Committee and consisted of members of the Committee (Professor PITTALUGA, Professor OTTOLENGHI, Drs. RAYNAUD, NOCHT and LUTRARIO, who acted as Chairman) and of experts (Colonel JAMES and Dr. MARCHOUX). In addition, the following corresponding members had been appointed:

Netherlands:	Professor SWELLENGREBEL.
Kingdom of the Serbs, Croats and Slovenes:	Dr. SFARCIC.
Roumania:	Professor CIUCA.
Ukraine:	Dr. ROUBASHKIN.
Russia:	Professor MARCINOWSKI.
Poland:	Dr. ANIGSTEIN.

The correspondents for Greece and Bulgaria had not yet been appointed. Dr. LABRANCA was the corresponding member for Italy.

The mandate of the Commission resolved itself into three parts:

(1) An enquiry into the incidence of malaria;
(2) An enquiry into the epidemiology of malaria;
(3) The world's requirements of quinine and the problems connected with its production, manufacture and distribution.

Concerning the incidence of malaria, the questionnaire to which Dr. Lutrario had just referred would be despatched to all the European countries in which that disease was endemic and the Governments of those countries would, at the same time, be invited to furnish information regarding malaria in their colonies.

It had also been decided that a tour of enquiry should be undertaken by the Commission in the following countries: the Kingdom of the Serbs, Croats and Slovenes, Greek and Serbian Macedonia, Bulgaria, Roumania, the Ukraine, Russia and Italy. This tour would last three months, at the end of which time a Conference would be held at Rome and a report prepared.

With regard to the epidemiology of malaria, the Commission had decided to confine its examination to the practical side of the problem.

With regard to the supply of quinine, no decision had been reached by the Commission regarding the convening of an international conference pending the preliminary enquiries which

were to be made by the experts. These experts would be five in number — one English, one French, one German, one Dutch and one Italian. They would be required to examine the world requirements of quinine, the present production and the means to increase it, the extension of the cultivation of cinchona to new countries, the cost of production and sale price and the distribution of quinine by the State or its sale by private firms.

The Commission had decided not only to examine the position with regard to quinine but also with regard to all its secondary alkaloids. Cinchonine, for instance, was a very valuable alkaloid with strong therapeutic properties, and in this connection Dr. Lutrario referred to a very interesting memorandum by Dr. Labranca which would be distributed to the members of the Committee and of the Malaria Commission. Dr. Marchoux would examine the alkaloids of quinine as well as the action of the auxiliary medicaments.

An enquiry into malaria had already been conducted in Albania, in Great Britain, in the Netherlands and in Denmark.

The Albanian Government had asked for an expert to assist for six months in its campaign against malaria. The Commission proposed that Dr. HAIGH, who had already conducted a preliminary enquiry in Albania, should be sent to that country for six months to carry out this work.

Colonel James had submitted a report on malaria in Great Britain, Professor Swellengrebel on malaria in the Netherlands, and Dr. Hansen on the same subject in regard to Denmark. These reports would be printed in proof form and distributed to the members of the Committee.

Other questions had been submitted to the Commission, namely:

(1) Proposals of Sir George Buchanan: these had reference to malaria in the countries of Europe where that disease was rare, and also the problem of quinine, etc.;
(2) Proposals of Dr. Stampar: these had reference to the international exchange of carriers of gametes, types of parasites, anti-larval measures in large stretches of water and quininisation;
(3) Proposals of Professor Ottolenghi, such as: the factors affecting the infection of the mosquito, the question of the species of plasmodium, one or several, etc.

The Commission had not thought it necessary to discuss these questions, which would be examined during the Conference at Rome.

The above statement was a summary of the work of the Commission, and Dr. Lutrario desired finally to enumerate systematically the conclusions reached by the Commission:

1. Members of the Commission should themselves act as corresponding members in order to prevent duplication, except in a special case — that of Italy. The corresponding members who had still to be appointed should be nominated by the health administrations concerned. They would take part, together with the other members, in the study tour, but would not assist in the drafting of the final report, which would be prepared entirely by the Commission. Corresponding members, when they attended the meetings of the Commission, would only take part in an advisory capacity.

2. With regard to the enquiries to be made, these would be carried out in two ways: (*a*) by means of a questionnaire; (*b*) by means of a study tour. Both methods would be used simultaneously.

3. The questionnaire would be sent to the corresponding members through the health administrations concerned, which would be requested to facilitate the work of the corresponding members and to check the results of the enquiries.

4. The plan of the study tour had been approved and it had been decided that it should end at Rome, where the final Conference would be held and the report drafted.

5. All other questions relating to the tour would be dealt with by correspondence and would be discussed at Rome.

6. The Commission considered that the purely scientific aspect of the question was not within its scope and that it should confine itself entirely to the practical aspect of the problem

7. The questions concerning quinine would be considered by the Committee of Experts, who would examine the questions of the production, cultivation and distribution of quinine according to the needs of the countries where malaria occurred, and Dr. Marchoux would submit a report on the therapeutic value of the different alkaloids of quinine and of the auxiliary medicaments.

8. The Commission had already adopted the resolution concerning Albania and the report submitted by Colonel James.

In conclusion, Dr. Lutrario expressed the hope that the work of the Commission would prove successful and that a great problem of general interest to humanity would thus be successfully solved.

The PRESIDENT thanked Dr. Lutrario for his interesting and comprehensive report.

Sir George BUCHANAN seconded the remarks of the President. The report showed that the Commission had made great progress and that its work was following satisfactory lines.

He desired to emphasise the fact that the study tour corresponded with the original proposal of the Health Committee that an independent body of experts should be created to act continuously as a central body to which the health administrations of the various countries could submit any problems concerning malaria, for information and advice. The institution of such a committee was of great practical utility, especially for countries in which the means to combat malaria were limited.

The study tour, therefore, was not intended to be a means of settling administrative questions by official advice given on the spot. The members of the Commission would undertake the

tour in order to become acquainted with the actual conditions in each country visited. The tour would, on this basis, be of obvious advantage to all future work, as members of the Commission would have begun by obtaining first-hand knowledge of the conditions prevalent in each country.

The appointment of five experts to deal with questions concerning quinine was of equal value. He hoped that each expert would summarise the available knowledge on the particular point in connection with quinine on which he was an expert.

Dr. LUTRARIO added that Portugal was also an important country from the point of view of malaria. Cinchona was cultivated in the Portuguese colonies, and Dr. Jorge might prepare a report on the state of the malaria campaign in his country.

Dr. MIMBELA reminded the Committee that South America had been the first continent to produce quinine. At the moment, owing to the competition of other countries, the South-American States only produced sufficient quinine for their own use. They possessed, however, great experience concerning the campaign against malaria, which would be of use to the Commission.

The Commission should specially pay attention, in his opinion, to the prophylactic measures to be taken against malaria.

Professor Ricardo JORGE said that he would submit to the Commission a report on the malaria campaign in Portugal and reminded the Committee that cinchonine had been discovered by a Portuguese doctor before the discovery of quinine.

Dr. RAJCHMAN pointed out that, in accordance with the rules of procedure (Rules 9 and 10), Dr. Lutrario's proposals would have formally to be adopted by the Committee. Further, the experts on the question of quinine would have to be nominated either by the President or by the Committee itself. He suggested, therefore, that the Committee should accept the corresponding members proposed by Dr. Lutrario, and that it should authorise the President to appoint the experts on the question of quinine.

Dr. LUTRARIO agreed.

Dr. TSURUMI said that the question of malaria was a very important one so far as the Far East was concerned. He hoped that the Commission would take account of the conditions in the Far East.

Dr. LUTRARIO said that the Commission would, in the beginning, confine its investigations to Europe, but that it would invite countries with colonial possessions to furnish information regarding those possessions. Once the enquiry into the conditions in Europe was well advanced, an enquiry in the Far East or in other parts of the world could be undertaken.

The PRESIDENT said that any information concerning malaria in Japan and the Far East would be of great use to the Commission.

Dr. RAJCHMAN, in answer to Professor Léon Bernard, said that Dr. Marchoux was an expert who was co-opted as full member of the Malaria Commission, and that it would be necessary for the Committee to appoint the experts on the question of quinine.

Sir George BUCHANAN emphasised the fact that several members of the Commission had gained their experience as regards malaria and also as regards the quinine problem from work in the Far East. In fact, the enquiry into European countries would have to be conducted in large measure in the light of the knowledge already gained concerning Eastern countries.

The PRESIDENT agreed.

The Committee adopted the report of Dr. Lutrario, approved the appointment of the corresponding malariologists, and authorised the President to appoint the experts on the quinine question.

74. **Report of the Opium Commission.**

Dr. CARRIÈRE, Chairman of the Commission, in presenting its report, reminded the Committee that, at the last session, it had decided, after having adopted the maximum figure of 450 milligrammes of raw opium per head per annum as the legitimate requirements, that its collaboration with the Opium Advisory Committee on this point should be considered as at an end. Since that time it had received, not from the Advisory Committee on the Traffic in Opium but from the Committee which was preparing for the Opium Conference in November, two requests for information which the latter Committee required in connection with the work of the Conference. The Opium Commission had thought that the decision taken by the Health Committee should not be considered as irrevocable and that it was not possible to turn a deaf ear to the request of those who were charged with the preparation of the new Opium Conference.

The Commission therefore considered the two requests which had been sent to its Chairman by the Health Section and the reply which it was proposed to send had been embodied in the report of the Commission. It should be remembered that the requests had only been received quite recently, and that, as they did not appear on the agenda of the present session of the Committee, they had had to be dealt with somewhat hastily, as the replies were required as soon as possible in view of the fact that the Opium Conference would meet in the autumn of 1924.

Both the questions asked referred to the figure of 450 milligrammes mentioned above; the first asked for supplementary information as to the way in which the figure had been obtained; the second asked for details regarding the figure—namely, the proportion of opium consumed as such, of morphine, heroin, codeine and the other opium derivatives.

As regards the first question, the Commission thought that it would be possible to meet

the Preparatory Committee of the future Conference; as regards the second, on the contrary, the Commission was bound to admit as a result of its examination that, in the present state of affairs, it was not possible to give a satisfactory reply. The reasons for the two recommendations which the Opium Commission begged to submit to the Health Committee were explained in its report.

Dr. Carrière reminded the Committee again that the Opium Mixed Sub-Committee had prepared a certain number of resolutions on certain points arising out of the problem of narcotics, and that these resolutions had been submitted to the Health Committee. He thought it would be of interest for these resolutions, in view of their importance, to be examined by the full Committee. They were completed by a report prepared by Professor Knaffl-Lenz dealing with the causes of the abuse of morphine and the means of fighting them; it would certainly be of interest to examine this report also.

Finally, Dr. Carrière stated, in order to avoid all misunderstanding, that the Opium Commission appointed by the Health Committee was solely responsible to it and that it was quite distinct from the Opium Mixed Sub-Committee, which had its origin both in the Health Committee and the Advisory Committee on the Traffic in Opium. This Mixed Sub-Committee, which still existed, had its own duties — namely, to study the questions submitted to it by the Opium Advisory Committee — whereas the Opium Commission of the Health Committee was the advisory body of the latter.

Professor Léon BERNARD emphasised the importance of giving as detailed a reply as possible to the questions asked in order to justify fully the reasons for the replies given.

Sir George BUCHANAN, referring to the third point in the Commission's report, thought that the Mixed Sub-Committee had, for all practical purposes, ceased to exist. While the Health Committee was perfectly at liberty to obtain any information it desired regarding opium and other dangerous drugs, it should not forget that there was in existence an International Convention regulating the production, sale and distribution of these drugs, and, further, that an Advisory Committee of the League existed for the purpose of supervising the execution of that Convention. The Health Committee should not encroach on the field of activity of the Advisory Committee on the Traffic in Opium and should therefore proceed with caution in all matters concerning narcotic drugs.

The PRESIDENT gave the figures for the *per capita* consumption of narcotic drugs in Denmark. These were as follows:

Opium . .	0.10 grammes	Cocaine .	0.007 grammes
Morphia .	0.02 »	Heroin . .	0.0015 »

Dr. CARRIÈRE was familiar with these figures but pointed out that they could not be taken as the basis for the details of the figure of 450 milligrammes because they represented the conditions existing in Denmark; these conditions were not applicable to all other countries in view of the differences — to which reference had already been made — in the medical uses of the drugs in the different countries.

In reply to Sir George Buchanan, he stated that the Mixed Sub-Committee had not come to an end but had only temporarily ceased to work.

Sir George BUCHANAN was of opinion that a question like the necessity of heroin in medical practice, which was recommended by the Mixed Sub-Committee, might usefully be studied by the Health Committee but that it was undesirable for the Health Committee to make a definite recommendation on the matter of prohibition. The prohibition of heroin was an administrative question and as such fell rather within the scope of the Advisory Committee on the Traffic in Opium.

The first reply contained in the report of the Opium Commission was adopted.

M. VELGHE said, with reference to the second question concerning the manner of dividing up the figure of 450 milligrammes, that it was most necessary that the Committee should state precisely why it was impossible for it to do this.

This was agreed, and Dr. Carrière undertook to modify and complete his report on this point.

The Committee decided to discuss the third part of Dr. Carrière's report concerning the recommendations of the Mixed Sub-Committee and the report by Professor Knaffl-Lenz on the causes of the abuse of morphine.

Sir George BUCHANAN was of opinion that the Health Committee ran the risk of going beyond its competence in recommending the suppression of heroin, as this was an administrative question and concerned the Advisory Committee on the Traffic in Opium. There was no objection to the Health Committee studying the problem of heroin, but unless it was expressly asked to do so it should not volunteer an opinion upon it.

Professor Knaffl-Lenz had recommended its suppression in his report, but that report was of an unofficial character and the Health Committee should hesitate formally to adopt it.

Dr. CHODZKO considered the question to be of great importance. In his opinion the Health Committee should take a decision regarding it.

M. VELGHE thought that the Health Committee, though it might determine not to take a final decision, need not necessarily reject the conclusions of the Mixed Sub-Committee. The problem should be carefully examined by the Health Committee.

Dr. RAJCHMAN pointed out that the opium question had always given rise to some difficulties in the discussions of the Committee owing to the fact partly that it came within the field both

of the Advisory Committee on the Traffic in Opium and of the Health Committee. It would be rather difficult for the Health Committee to decide once for all that it would not consider the question of opium except on the specific request of the Advisory Committee on the Traffic in Opium and other Dangerous Drugs.

The fourth Assembly had decided that two Conferences on the opium question should be held at the end of 1924, largely because the Advisory Committee only included representatives of the producing and manufacturing countries, whereas the co-operation of the consuming countries was required in addition. The Conferences, one of which concerned only the Far East, would not revise the International Opium Convention of 1912 but would be convened with the object of studying the limitation of the production and manufacture of narcotic drugs. A Preparatory Committee had been established to draft the programme of both Conferences. The estimate of 450 milligrammes *per capita* consumption adopted by the Health Committee had been submitted to the Preparatory Committee. This had been the most important figure so far proposed, on which estimates of legitimate consumption could be based by the forthcoming Conference. The Preparatory Committee, not unnaturally, desired further evidence in order to corroborate this figure.

With regard to Sir George Buchanan's point, the Health Committee need not fear to express an opinion involving possibly administrative measures, because the Council of the League, in whose hands the final decision lay, was bound to consult the Advisory Committee on the Traffic in Opium in all matters concerning narcotic drugs. Were, therefore, the Health Committee to recommend the suppression of heroin, that recommendation would be submitted by the Council to the Advisory Committee on the Traffic in Opium for an opinion. The Health Committee was therefore perfectly free to undertake an enquiry if it so desired.

Surgeon-General CUMMING said that all questions with regard to opium and narcotic drugs had always been subjected to a very complicated form of procedure. The ultimate problem, however, was whether the world's output of opium should or should not be restricted. If the Health Committee had the power to give advice regarding the amount of opium which could be legitimately consumed *per capita*, it seemed to him that it had an equal right to give any advice it thought fit regarding the use of an opium derivative like heroin.

The Public Health Service of the American Army and Navy and a very large number of public hospitals had decided that heroin was unnecessary, and it had been removed from the list of drugs used in public hospitals. Sixty-three per cent of the physicians in the United States, when asked, had also replied that heroin was, in their opinion, unnecessary. Of the remainder, some had defended its use on the ground that a doctor should always be free to prescribe whatever drugs he thought fit, and others that it was necessary for the treatment of certain diseases, notably tuberculosis.

Heroin, owing to the fact that it was six times as strong as morphia, was far more profitably smuggled. The only way to put a stop to the smuggling trade would be to suppress the manufacture.

Professor PITTALUGA proposed that the Health Committee should decide to study all the questions contained in the report of the Mixed Sub-Committee.

Dr. CARRIÈRE proposed that the Opium Commission should be requested to examine the resolutions of the Mixed Sub-Committee and should submit the results of its examination to the Health Committee, which, having all the facts before it, would then be in a position to express an opinion.

Sir George BUCHANAN thought that the Commission should study heroin from the point of view of its necessity in medicine.

M. VELGHE agreed. The Committee, however, should go as far as possible without actually deciding for the present in favour of the suppression of heroin.

Dr. LUTRARIO said that an enquiry had already been conducted in Italy, the results of which were contained in a report which would be at the disposal of the Commission.

Dr. RAJCHMAN hoped that the Commission would meet in advance of the Health Committee so as to allow time for the distribution of its report.

After a further exchange of views, *it was decided that Dr. Carrière should draft a resolution, in the sense of the discussion, for submission to the Committee at its next meeting.*

75. **Dutch Proposal concerning Quarantine Clearance of Ships: Submission of Draft Resolutions.**

M. VELGHE submitted a draft resolution in the following terms:

> "The Health Committee:
> "Considering that certain parts of the present International Sanitary Convention no longer conform to modern scientific facts, and that, in consequence, there is a risk that certain articles do not confer the desirable degree of security:
> "Recommends that this Convention be revised with the least possible delay."

In view of the request which had been made, he proposed that this resolution should be completed in order to contain a reference to the resolution adopted by the Assembly concerning the part which might be played by the Office international d'hygiène publique in the revision of Sanitary Conventions.

After an exchange of views, *this proposal was adopted*, and it was understood that a revised text would be submitted at the next meeting.

M. VELGHE submitted a second resolution in the following terms:

"The Health Committee:

"Having considered the Dutch proposal to restrict measures in respect of ships which have already been given *libre pratique* in a foreign port;

"Having in mind that this proposal is in conformity with the spirit of Article 41 of the International Sanitary Convention of 1912;

"And in view of the desire expressed by the Committee to hasten the revision of the International Sanitary Convention of 1912:

"Decides:

"(1) To recommend Governments to conclude separate agreements of the kind referred to in Article 41 of the 1912 Convention with the object of limiting the formalities which hamper commercial relations;

"(2) To entrust to a Commission the task of studying the practical measures necessary to facilitate the conclusion of such agreements;

"(3) In the event of difficulty in the application of such agreements, to place its services at the disposal of Governments desiring to obtain the mediation of the League of Nations."

Dr. LUTRARIO thought, with regard to the second recommendation, that a reference should be made to the health services in ports.

Dr. JITTA was of opinion that the words "practical measures" covered this point.

Sir George BUCHANAN suggested that the actual wording of Article 41 of the International Sanitary Convention of 1912 should be used.

This proposal was adopted.

On the proposal of the PRESIDENT, *the Commission referred to in the resolution was constituted as follows:*

Surgeon-General CUMMING.	Dr. NOCHT.
Sir George BUCHANAN.	Dr. RAYNAUD.
M. VELGHE.	Dr. TSURUMI.
Dr. JITTA.	Dr. MIMBELA.

FOURTH MEETING

Held at Paris on Saturday, May 10th, 1924, at 10 a.m.

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76. Establishment of an Epidemiological Intelligence Bureau in the Far East: Report of the Commission.

Dr. JITTA submitted the Commission's report (Annex 24), in which it was proposed to recommend to the Council the port of Singapore as the place in which the Epidemiological Intelligence Bureau for the Far East should preferably be established. He added that, personally, he had had to submit to the necessity of making a suggestion on this subject before the next session of the Council of the League in June, the more so as most of the interested States had already expressed their opinion.

The report was approved.

77. Dutch Proposal concerning Quarantine Clearance of Ships: Approval of Draft Resolutions.

M. VELGHE read the following resolutions:

I. "The Health Committee:

"Considering that certain parts of the present International Sanitary Convention of 1912 no longer conform to modern scientific facts and that, in consequence, there is a risk that some of its articles do not provide the degree of security which is desirable:

"Recommends that this Convention be revised with the least possible delay.

"The Committee wishes, in this connection, to refer to the decision adopted on September 15th, 1923, by the fourth Assembly of the League of Nations, which recommends that, in order to effect appreciable economies and to avoid overlapping, it might be advisable to consider the possibility of authorising the Advisory Council of the Health Organisation (the Permanent Committee of the Office international d'hygiène publique) to act in certain cases as a Conference for the purpose of the conclusion of Conventions or for the revision of certain Conventions."

II. "The Health Committee:

"Having considered the Dutch proposal to restrict measures with respect to ships which have already been given *libre pratique* in foreign ports;

"Having in mind that this proposal is in conformity with the spirit of Article 41 of the International Sanitary Convention of 1912;

"And in view of the resolution of the Committee that it is desirable that the revision of the International Sanitary Convention of 1912 should be expedited:

"Decides:

"(1) To recommend Governments to conclude separate agreements of the kind referred to in Article 41 of the 1912 Convention with the object of limiting the formalities which hamper commercial relations;

"(2) To entrust to a Commission the task of studying the practical measures necessary to facilitate the conclusion of such agreements; and

"(3) In the event of difficulty in the application of such agreements, to place its services at the disposal of Governments which may desire to obtain the mediation of the League of Nations."

M. VELGHE added that it was understood that, in accordance with the proposal made by Sir George Buchanan at the preceding meeting, the second paragraph of the resolution would be completed by the use of the terms of Article 41 of the Convention of 1912.

Sir George BUCHANAN emphasised the importance of the proposal made by the Medical Director at the preceding meeting to the effect that the Health Committee and the Advisory Committee on Communications and Transit should collaborate in this matter. While agreeing with the advantages of this course, he considered that the drafting of the revised Sanitary Convention should be left to the health experts and that no Mixed Sub-Committee should be established.

The resolutions were adopted.

78. **Interchange of Medical Officers of Health.**

The following resolution was presented by the PRESIDENT and *adopted by the Committee:*

"The Health Committee:

"In view of the definite programme adopted at its first session with regard to 'the interchange of medical officers of health', as well as in view of the results obtained hitherto from the application of this system;

"Considering that it is proving of permanent value to a very large number of Public Health Administrations and lends itself eminently to facilitating an intimate collaboration between the Public Health Administrations of all countries through the intermediary of the Health Organisation of the League:

"Is of opinion that the organisation of the interchange of medical officers of health has proved its practical utility and ought to be continued systematically.

"It therefore recommends that the item for the 'liaison service between the public health administrations' in the estimates for the Health Organisation for 1925 should be increased to 250,000 francs."

79. **Work of the Commission on the Teaching of Public Health.**

Professor Léon BERNARD informed the Committee that the Commission on the Teaching of Public Health had not yet been able to meet but that it was desirable that it should do so before the next session of the Health Committee.

He proposed that its membership should be completed by the addition of Professor OTTOLENGHI.

He further proposed that the following experts should be nominated: Sir George NEWMAN, Dr. Andrew BALFOUR and Dr. STAMPAR, who would become full members of the Commission.

These proposals were adopted.

80. **Representation of the Health Committee at the International Conference on Tuberculosis.**

Professor Léon BERNARD informed the Committee that an International Conference on Tuberculosis would meet in Lausanne on August 5th, 1924. The Executive Committee of the Union international was desirous that some members of the Health Committee should take part in the Conference.

Dr. CARRIÈRE, as representative of Switzerland, and as a member of the Union, seconded this invitation.

The Committee requested Professor Léon Bernard to represent it at that Conference, together with such of his colleagues as might wish to be present.

81. **Report of the Opium Commission: Approval of Draft Resolution.**

Dr. CARRIÈRE read that part of his report concerning the figure of 450 milligrammes which had been modified in accordance with the discussion at the preceding meeting.

This part of the report was approved, with certain amendments proposed by M. Velghe (Annex 25).

The Committee decided that Dr. Carrière's report should be completed by the addition of the following resolution:

"The Health Committee:

"After noting the conclusions reached by the Opium Mixed Sub-Committee which are contained in paragraphs II to V on page 97 of the Minutes of its First Session (February 1924);

"Considering that these recommendations, besides raising certain problems of a purely administrative character, also raise questions of a medical and health nature which should engage the attention of the Committee, and on which it is important that the Committee should reach a decision after an examination of all the facts:

"Instructs the Opium Commission to submit these conclusions to careful study and to prepare a report for consideration at the next session of the Committee."

82. **Standardisation of Sera and Biological Products.**

The PRESIDENT summarised the work of the Permanent Standards Committee held at the Pasteur Institute on May 2nd and 3rd.

As far as anti-diphtheritic serum was concerned, the Permanent Standards Committee adopted the following resolution:

"It is desirable that the factories in every country should supply phials containing the same standard quantities of anti-toxic units for preventive and therapeutic injections. The capacity of these phials should be graded as follows:

"Preventive dose . . . . . 1,000 units.
"Minimum therapeutic dose . . . 10,000 »
"Half-dose . . . . . 5,000 »

Concerning anti-tetanic serum, Professor Kolle, of Frankfort, had prepared the new German unit, but the titration of the standard German and American sera at Copenhagen and Washington had shown some disagreement in results, and these discrepancies indicated that probably the use of a standard toxin as well as a standard anti-toxin would be found necessary. Experiments along these lines were now being undertaken.

Concerning anti-pneumococcal serum, the Copenhagen Institute had elaborated a method for the titration which might make it possible to have comparisons between the serum as supplied from different institutes. Before a final agreement was reached, it would seem advisable to get information about therapeutic results obtained with this serum, as the views seemed to be rather divergent in different countries.

The question of anti-dysenteric serum was now so advanced that an agreement might be obtained, and in the Permanent Standards Committee the following proposal was adopted:

"The Committee is of opinion that the work of standardising anti-dysenteric (Shiga) serum has now reached a stage at which an agreement would be facilitated if a meeting of the persons principally occupied in this research work were held at a central laboratory, such as the one suggested by Professor Madsen, President of the Committee, where the methods employed could be examined and regulated."

The Committee was planning to convene a laboratory conference in Copenhagen, probably at the beginning of July.

The President gave a summary of the report of Dr. Dale, especially pointing out that, as far as insulin was concerned, it was anticipated that, before long, it would be possible to reach an agreement.

Concerning arseno-benzol, an agreement seemed to be likely, as information obtained from Professor Kolle, of Frankfort, and Professor McCoy, of Washington, showed that the differences between the American and German methods were of no very great importance. Professor Dale was now assembling all official information about the standardisation of the arseno-benzol from different countries, and there was every reason to anticipate that an agreed method would be adopted before the end of the year.

Professor Léon BERNARD, in the name of the Committee, thanked the President for his summary. The work of the Permanent Standards Committee represented one of the most important activities of the Health Committee. He asked Dr. Madsen what he thought of the work of Dr. Ramon (of the Pasteur Institute) on the diphtheritic toxin in connection with the research undertaken by the Permanent Standards Committee.

Professor OTTOLENGHI informed the Committee that he was carrying out research with a polyvalent anti-pneumococcic serum which he had prepared with strains freshly isolated by one of his pupils. He would be happy to control this serum also by the method prepared by the Permanent Standards Committee, and he stated at the same time that, if the serum proved active for man, he would willingly send samples to that Committee.

He had been informed that free pneumonia had almost entirely disappeared from the north of France. Would it be possible to obtain information on this point ?

Professor PITTALUGA asked that the investigation into the arseno-benzols should be extended to cover, from the point of view of their toxic quality, other products, such as those of antimony — above all, "stybenil" and similar products which had sometimes very disagreeable and unexpected effects (one death had occurred at Madrid), even though having a very important therapeutic action — particularly in cases of leishmaniasis.

Professor Léon BERNARD informed Professor Ottolenghi that the information regarding the so-called disappearance of pneumonia in France referred to discussions of an academic nature regarding the clinical limits of so-called "free" pneumonia. In point of fact, pneumonia had not disappeared from France, but it was less frequent there than in other countries — for example, in North America.

The PRESIDENT thought that the investigations by Dr. Ramon to which Professor Léon Bernard had referred were important — above all, in connection with vaccination. The investigations of the Permanent Standards Committee, however, were only concerned with the standardisation of the serum.

Sir George BUCHANAN emphasised the importance of the work of the Permanent Standards Committee. It was desirable that the Conference which would meet in Brussels in 1925 should profit from this work (see letter from the Belgian Ministry of Interior, Annex 26).

The PRESIDENT added that the Permanent Standards Committee had also begun to examine the question of the unification of methods of analysing milk and water, but that a general agreement about these methods had not appeared to be possible. A record of the very remarkable work carried out in this connection in the United States would be published by the Office international.

83. **Date of the Next Session of the Committee.**

The Committee decided that its next session would begin on September 29th, 1924.

84. **The Question of Venereal Diseases.**

Dr. RAJCHMAN reminded the Committee that a report on venereal diseases had been distributed to the members.

It was agreed that this report would be discussed at the next session.

85. **Composition of the Mandates Commission.**

The Committee decided to add Dr. RAYNAUD *to the Commission entrusted by the Health Committee with the examination of the reports of the Mandatory Powers.*

86. **Close of the Session.**

The PRESIDENT thanked his colleagues for the help which they had given him during the session.

Sir George BUCHANAN, in the name of the Committee, congratulated the President on the just and skilful manner in which he had presided over its deliberations.

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Annex 20.

AGENDA OF THE SECOND SESSION OF THE HEALTH COMMITTEE OF THE LEAGUE OF NATIONS.

Approved by the Committee on May 7th, 1924.

1. Progress Report of the Medical Director.
2. Representation of the Red Cross Societies on the Committee.
3. A list of six experts for the Turkish Government.
4. The consideration of the representations of the interested Governments concerning the establishment of the Far-Eastern Bureau for Epidemiological Intelligence.
5. The proposal of the Dutch Government concerning *libre pratique* in Ports.
6. Nomination of the Health Committee representatives on the Governing Body of the London School of Hygiene.
7. Report of the Opium Commission.
8. Report of the Malaria Commission.
9. Standardisation of sera and biological products: Report by the President.
10. Miscellaneous.

Annex 21.

REPORT OF THE MEDICAL DIRECTOR ON THE WORK ACCOMPLISHED SINCE THE LAST SESSION OF THE COMMITTEE.

Speech delivered before the Committee on March 7th, 1924.

I would first remind you that the report to the Council of the League of Nations on the work of the Health Committee which was distributed to you last March was presented to the Council by Viscount Ishii.

You will, of course, remember that the Council welcomed your recommendation to accede to the Persian Government's request that a sanitary enquiry should be undertaken in that country: this enquiry you decided to entrust to one of the representatives of the Epidemic Commission. Dr. Gilmour, of the Egyptian Government Service, has been chosen as that representative and will shortly leave for Persia via Baghdad.

I should say that, at the Health Committee's last session, it was thought that it might be possible to send Dr. Gilmour via Russia, so that he might investigate the plague centre in the Kirghiz Republic. On closer examination, however, it was not found possible for the same representative to undertake both enquiries during one voyage. The most favourable time of the year in Persia is from June to September, as the rainy season begins in October. It is, moreover, extremely important to have a preliminary report on the epidemiological situation in Persia, and an enquiry in the Kirghiz Republic would take from six weeks to two months. In these circumstances, it was decided to send a second investigator to Russia, and Dr. Cazeneuve, of Tunis, was selected; he is a distinguished epidemiological expert, with an intimate knowledge of the epidemiology of plague, cholera, smallpox, etc. Negotiations with the Soviet Government at Moscow in regard to Dr. Cazeneuve's journey are still being carried on and it is not yet possible to say when he will be able to go to Russia.

I also wish to call your attention to the fact that the Council took note of your recommendation to authorise the representatives of the secretariat of the League of Red Cross Societies and of the International Committee of the Red Cross to attend the meetings of the Health Committee when questions which interest those organisations more particularly are under discussion. I asked the President of the Committee whether I should send the agenda of the second session to the two secretariats, so that they might be able to send a representative if they thought it desirable. The President replied in the affirmative, and action was taken accordingly. We thought it proper, however, to inform the two secretariats that the agenda was not, in our opinion, of any great interest from their point of view, and that the items on it were mainly questions

affecting internal policy. The subject most likely to interest the Red Cross Societies was Dr. Lutrario's very important report on malaria, as the League of Red Cross Societies and the International Committee of the Red Cross have recently sent Commissioners to Greece.

Dr. Norman White is going to Greece at the end of next week to carry out an enquiry into malaria.

Interchange of Health Personnel.

A circular letter has been sent to the heads of the health administrations in all countries, drawing their attention to the programme of interchanges in its present form and to the Committee's decisions, which were explained as clearly as possible.

Let me now give you a list of the interchanges organised since January 1st, 1924:

The first was the interchange for medical officers of health concerned in health questions generally which was held in Great Britain from February 2nd to April 10th and was attended by twenty-five medical officers, representing twenty countries. I wish here to call your attention to the extreme care taken by the British health authorities, the London Ministry of Health and Sir George Buchanan to perfect the organisation of this interchange. If I had any criticism to make it would be that too much attention was paid to the comfort of those taking part ! The British Government most hospitably offered an official luncheon at Wembley. Sir George Buchanan arranged for a special meeting of the Royal Society of Medicine in London, at which the Minister of Health made a speech describing the main lines of the League's Health Organisation and emphasising the great importance which the British Government attached to the Health Committee's work, in general, and to the activities of the epidemiological intelligence service in particular. I, too, was asked to give a general survey of your work and activities. I wish to thank Sir George Buchanan for having kindly arranged this extremely interesting meeting. I am sure that the Health Committee will also desire to offer its thanks to the various health authorities in the other parts of the United Kingdom, namely Scotland and Wales, where no trouble was spared to contribute to the good organisation of the interchange.

I also wish to thank the health administrations of the other countries in which interchanges of health personnel have taken place.

There have been two other interchanges since January. The first was for tuberculosis specialists and was attended by sixteen experts representing thirteen different countries; in about 100 days, these experts travelled through eight European countries: Austria, Czechoslovakia, Hungary, France, Belgium, Great Britain, the Netherlands and Switzerland.

I should like to state that, when these interchanges were planned, the programmes were not drawn up in the way which we should now adopt in the light of past experience. For instance, in the case of the tuberculosis interchange, the visits among the various countries might have been better distributed, more especially as regards France, where the doctors should have remained at least a week longer, so as to give them the necessary time to inspect the magnificent campaign against tuberculosis which is carried on in that country. This inspection was, in point of fact, far too hurried.

I shall not again refer here to our deep appreciation — which I have already expressed to the Governments of those countries visited — of the welcome given to the doctors taking part in the interchanges, but I should like to draw particular attention to the extensive facilities for railway travel granted by the Czechoslovak, Hungarian and Austrian Governments.

A school hygiene interchange took place at the same time as the interchange of tuberculosis specialists. The former was attended by thirteen representatives of twelve countries, and, while thirteen countries were visited by those taking part in the tuberculosis interchange, the specialists in school hygiene confined themselves to three. They met at The Hague on May 10th for a final conference there. The visit lasted forty-two days.

The second interchange for medical officers of health concerned with health questions generally began on April 24th in the Netherlands. This interchange is still in progress and is being attended by twenty-five doctors representing twenty different countries and should last about forty days. This is the first occasion on which we have succeeded in obtaining the participation of medical officers representing independent States in North America.

This interchange in the Netherlands, which was most carefully organised by Dr. Jitta, will finish at the end of May; that organised in Denmark by the President of the Health Committee will begin on June 1st. Twenty-seven doctors representing twenty-one countries will take part. The visit will last forty-two days and the total number of doctors taking part in the two interchanges will be forty-two, representing twenty-five countries.

Dr. Jitta and Dr. Madsen have in each case assembled in a single volume the lectures to be given. While, however, the Dutch volume is complete, that regarding Denmark lacks certain details and will accordingly be distributed first in proof, the final edition being distributed during the interchange itself.

The interchange organised in Switzerland will be attended by some twenty doctors belonging to eighteen countries and will last forty-two days. Dr. Carrière has kindly prepared, for the use of those taking part, a volume which will be distributed in good time.

While the Dutch and Danish volumes will include a number of separate articles by various contributors, the Swiss volume will be a survey in the form of a monograph written by Dr. Carrière himself.

The total number of medical officers invited to take part in the interchanges held since January is one hundred and sixteen, and the number of countries represented thirty-five.

You will recollect the resolution which you adopted concerning the publication of reports submitted during final conferences. We have so far sent only one report to the printer — that by Dr. van Boeckel on the campaign in the United States for the active immunisation against diphtheria. Before being definitively published, this report was sent for approval to the Federal Public

Health authorities of the United States, and a note has been received from Dr. White, acting head of the service, in which he gives certain observations and supplementary details, which will be incorporated in the report by Dr. van Boeckel, so that it will then be published in accordance with the terms laid down by the Health Committee.

There is another interesting fact to record: namely that, on April 6th, the medical officers who met at Geneva for the final conference which closed the British interchange decided to set up an International Association of Medical Officers of Health, which will at first be restricted to medical officers who have taken part in interchanges. A small provisional committee was appointed consisting of representatives of the United States of America, Italy, Ecuador, Germany, Russia, Poland, France and Great Britain; Professor Christiani, of Geneva, will act as Secretary. One of the main objects of the Association is to second as far as possible the work of the League of Nations Health Organisation.

Epidemiological and Public Health Intelligence Service.

As regards the work of the Epidemiological and Public Health Intelligence Service, I have to inform you that Mr. Sydenstricker has been obliged to return to America. He has been replaced by Dr. Eichel, who, until now, has been Statistician-in-Chief to the State of New York. Dr. Eichel has been granted six months' leave and has taken charge of the service.

We have done nothing more than continue, within the limits set by the decisions of the Health Committee, the work already begun. Since the last session of the Committee, three *Epidemiological Reports* have been published — Nos. 64, 65, and 66. As you may have noticed, certain new features have been introduced:

1. In conformity with the decisions of the Health Committee, it has been made quite clear that the publication is issued by the Health Section of the Secretariat of the League of Nations.
2. It has also been made abundantly clear that the remarks preceding the statistical tables are not in the nature of comments but are merely a general summary.

A change has also been made in the manner of setting out the periodical reports sent by the various States. This has been done for reasons of economy and in order to make the tables clearer. The reports have been divided into two or three categories. First, as regards the statistics for countries sending weekly reports, the date columns are the same throughout the whole page. Paper is thus economised, and at the same time the reader can see at a glance the date on which the reports were sent to the Secretariat. Secondly, as regards mortality rates for large cities, the number of cities from which periodical data are being obtained has been increased. Finally, special prominence has been given to epidemiological data of peculiar interest, such as the data regarding malaria in Russia and the development of plague.

We are not yet in a position to submit to the Health Committee the proofs of the annual report for 1923. These proofs, which contain data regarding all countries, have been sent to twenty-eight health administrations with the request that the departments should either make all the necessary corrections or furnish the Health Section with data for the last five years (1919-1923).

Data concerning trachoma are being collected, and in this connection I should like to thank Professor Pittaluga for the information which he has furnished on the subject.

In accordance with the decisions of the Health Committee, several statisticians have been invited to study three or four fundamental problems connected with vital statistics:

1. A preliminary statement on the uniformity of statistical tables on causes of death with respect to age and sex.
2. A preliminary report on the lack of uniformity in the definition of still-birth.
3. A preliminary report on the comparability of data on the causes of death in different countries.
4. A preliminary report on the corrections to be introduced in the gross mortality rates in international and other comparative statistics.

We are continuing to receive reports concerning the organisation of the Health Services in European countries and the procedure followed in compiling vital statistics.

The two "dossiers" concerning health statistics in the Netherlands and in Belgium have been approved and are now ready to be published in final form. It is thought that Dr. Greenwood will be in a position to send to the Health Section by June the "dossier" regarding England and Wales and the "dossiers" concerning Spain and Portugal.

Finally, arrangements are being made for a special interchange of statisticians in connection with the question of the notification of infectious diseases.

Before closing this survey of the work of the Epidemiological and Public Health Intelligence Service, I should inform you that the International Conference on Leprosy which met at Strasburg has communicated to the Health Section a series of resolutions. These resolutions were proposed by Professor Marchoux, who might perhaps communicate them to you himself at a subsequent meeting.

Work of the Commissions.

Almost all the Commissions have met. The Malaria Commission has held two very interesting meetings this week and Dr. Lutrario will submit to you a report on the subject.

The Permanent Committee on the Standardisation of Sera and Biological Products held two meetings last week, and our President will submit a report.

As regards the serological and biological work, I have sent a circular letter, in accordance with your instructions, to the heads of all the health administrations informing them of the resolutions adopted by the Health Committee concerning the diagnosis of syphilis and requesting them to be good enough to furnish us with information on this subject. Up to the present, three very detailed letters have been received, including a most interesting communication from Dr. Lutrario. As soon as a greater number of replies have been received, I propose to send to the members of the Committee a memorandum on the subject.

I have taken steps to obtain information concerning the supervision and inspection of biological products in all the civilised countries of the world. I hope to receive within the next two or three months information concerning legislation in connection with the supervision and inspection of biological products and information concerning insulin. I hope, therefore, that I shall be in a position to make a very detailed statement on the subject at the third session of the Health Committee.

The Opium Commission met twice last week, two questions having been referred to it, and in this connection Dr. Carrière will submit a report.

The Commission on the Teaching of Hygiene and Social Medicine has not met, but it has been in communication with Professor Welch, of Baltimore, who is prepared to come to Europe to discuss the work of the Commission. Moreover, I have reason to believe that two or three other very distinguished public health specialists are willing to co-operate in the work of this Commission.

The Cancer Commission has not met, but a meeting of British and Dutch research workers, together with the Italian experts, is to be held in Rome under the auspices of Dr. Lutrario, and an exchange of views will take place.

We have endeavoured to collect the reports of the Mandatory Powers on the health situation in the territories under mandate. It will be remembered that the examination of these reports was entrusted to a special Commission, but in this connection two difficulties have arisen: First, Dr. Balfour, the Chairman of the Commission of Experts on Sleeping-Sickness, has, much to his regret, been obliged to decline this new responsibility. We have therefore applied direct to two members of this Commission of Experts: Dr. Gustave Martin and Dr. van Campenhout, who have agreed to undertake this work.

The second obstacle is the material difficulty of obtaining the reports of the Mandatory Powers. We have prepared a note on the subject for the members of the Health Committee who are also members of its Commission.

The Anthrax Commission held a short meeting this afternoon and its proposals will be submitted to the Health Committee by Professor Ottolenghi.

Finally, I have to inform you that the budget estimates drawn up at the last session of the Committee will be discussed on Saturday or Monday by the Supervisory Commission at Geneva.

In conclusion, I should like, if you will allow me, to add a few remarks concerning my journey in the Kingdom of the Serbs, Croats and Slovenes six weeks ago, where I went to prepare the ground for the collective study journey which the members of the Malaria Commission have decided to undertake. I spent about twelve days in Croatia, Slovenia and Dalmatia, and I propose to submit to the Committee a rather more detailed report on the remarkable developments which have taken place in the health administration of the Kingdom of the Serbs, Croats and Slovenes.

I would like, however, to state now that the work carried out there deserves very careful study. Much may be learnt by all those who are interested in the development of public health. The institutions established by Dr. Stampar during the last three years for combating tuberculosis, for the protection of childhood and maternity, and for the campaign against venereal diseases, the schools of hygiene, the institutes of hygiene (28 in all), and possibly the campaign conducted against malaria, would, as a whole, do credit to the most highly organised European States or to the United States.

I am very glad that the Health Committee decided at its first session to organise next year a "general" interchange in the Kingdom of the Serbs, Croats and Slovenes, and I am sure that it will prove to be one of the most successful of all the interchanges.

Annex 22.

NOTE ON THE DUTCH PROPOSAL REGARDING THE QUARANTINE CLEARANCE OF SHIPS IN PORTS.

By Dr. N. M. Josephus JITTA.

Submitted to the Committee on May 8th, 1924.

[*Translation.*]

The Dutch Ordinance of January 3rd, 1923, relating to the campaign against contagion from ships coming from the high seas, prescribes in Article 3 (paragraph 6) that certain ships need not be considered as coming from a given port, county or locality provided that they have been

admitted to free circulation in Dutch ports or foreign ports to be indicated by the competent Minister, and provided, further, that nothing has subsequently happened to necessitate the application of sanitary measures, and that the ships have not subsequently touched at a port declared infected by the Minister above cited.

The aim of this clause is perfectly clear, *viz.*: to allow as much freedom as possible to navigation. For the same reason, the medical examination has been limited as far as practicable. This examination is compulsory only for ships coming from the high seas and having on board one or more cases of plague, yellow fever, cholera, smallpox or typhus, or for ships which, within the three previous months, have called at a port declared to be infected with one or other of these diseases. As regards a ship starting from, or having touched at, a port declared to be infected for one of the causes cited above, and which has subsequently, within a period of three months, called at another port where it has been admitted to *libre pratique*, the Dutch Government recognises that the danger of transmission of disease no longer exists, provided that the admission to the latter port has been granted for reasons that are in all respects valid.

The Dutch Government is, however, unable to judge of itself as to the value of the sanitary measures applied in a foreign port and would like some general rule to be established in this connection. It is for this reason that the Dutch Government addressed itself to the Secretariat of the League of Nations with the request that it would, if possible, take the initiative in this matter.

I wish, at the outset, to make it clear that there is no question here of the interest of any particular nation but that the Dutch Government considered this question of sufficient importance from the international point of view to submit it to the League of Nations.

The Health Committee (after consultation with the Office international d'hygiène publique) might draw up the necessary rules:

(1) To ensure in all ports an adequate disinfection or deratisation, the suitable treatment of patients, the surveillance or observation of contacts and suspected cases, etc.;
(2) To establish a system of international control in the various ports, with the aim of assuring itself not only that these ports are sufficiently equipped for the work in hand but also that the necessary measures are receiving practical application.

During the meeting of the Provisional Health Committee held at Paris on June 2nd, 1923, I was given the opportunity of explaining the intentions of my Government.

I had the satisfaction of noting that all the members present, thanks above all to the support given me by Dr. Lutrario, recognised the importance of the proposal which I was called upon to explain. Nevertheless, the question, in its practical aspects, was extremely difficult and complex. Several objections, of undoubted weight, were put forward. These objections may be summarised as follows. Most countries would refuse to allow in their own ports a foreign inspection or control — even if carried out by the League of Nations. Further, it would be necessary that all the countries interested should recognise the international authority, a recognition which could not be forced. I pass over other difficulties which were raised. I realised clearly that the Health Committee could not deal with this question without having previously submitted it to a thorough examination. The Commission nominated for this purpose has not yet expressed its opinion, and it may, perhaps, be assumed that it has not been possible to reach an agreement. Dr. Lutrario, at the last session of the Health Committee, in February 1924, presented a very interesting note showing how a general system of regulation might be established and, in consequence, how an international convention might be adopted. Nevertheless, this note could not refute the fundamental objections raised at the outset by the other members.

It is, in fact, perfectly true that it is necessary to secure an international understanding based not on the order of an international authority but on the free co-operation of the various States.

It is conceivable that this co-operation might manifest itself in the form of attributing a right of surveillance and control to an existing international authority such as the League of Nations. This authority should, then, have the right and the duty of surveillance, and should indicate the ports the installation and personnel of which inspired confidence. But it has already been said, and even almost proved, that it will be difficult to secure the unanimous adherence of the various States to such an administrative system.

Will this difficulty continue, or is there a possibility of its being overcome at some future time ? I trust I shall not be thought unduly optimistic in assuming that one day all these difficulties may be surmounted. But there is at the moment a further obstacle, arising from the fact that the revision of the Sanitary Convention of 1912 has not yet been carried out.

In the scheme for the revision, a number of measures, based on the data afforded by modern science, are prescribed for the control of infectious diseases, but until the proposed conference on this matter has been held, and, above all, until the various interested nations have declared themselves ready to submit to the terms of this convention, it would perhaps be premature to endeavour to set up a special system of regulation for seaports.

After what has been said above, it will not perhaps occasion any surprise that my private opinion should be in favour of adjourning any decision concerning the Dutch proposition. In view of its importance for navigation, it should not be rejected merely because some practical difficulties stand in the way. These difficulties, indeed, might be overcome at a later date. "Where there's a will there's a way."

Another question, which presents itself immediately, is the following: is it necessary, in view of a postponement which I prefer to consider as obligatory, to take no immediate action and to leave any possible arrangements till a later date ?

It seems to me that there is a way of advancing, step by step, but in a manner that would give a certain amount of immediate satisfaction, and prepare the ground for the future. It

would be possible to begin slowly, and not pass immediately to a general administrative system. A favourable atmosphere might be created for an international agreement between two or more neighbouring States. It would then be possible to designate and classify the ports, to acquire reliable information as to the value and quality of the methods used, and to replace collective surveillance by mutual confidence.

The intervention of the Health Committee of the League of Nations would then be of great value. It could draw up, after consultation with the Advisory Council, on which almost all the interested countries are represented, the main lines of a model special convention (as I conceive it) and express the hope that neighbouring States might begin with an arrangement based on this model. Are there not already in existence conventions of this nature between countries with a common frontier, such as Italy and France for the ports of the Mediterranean ?

The securing of any results in this matter is contingent on the functioning of three elements:

(*a*) The general system of regulation, the principles of which may be established by the League of Nations;
(*b*) The system of surveillance, the rules for which might also be prepared by the League, in order not to offend the susceptibilities of the interested parties;
(*c*) The creation of an Arbitral Committee to operate in case of a divergence of opinion as to the execution of the limited conventions.

If these conditions are fulfilled, the mutual confidence which is indispensable between contracting States will find a valuable auxiliary in an international organisation.

Annex 23.

THE CAMPAIGN AGAINST MALARIA

Report by Dr. Lutrario on the Work of the Malaria Commission

(April 5th and 6th, 1924).

Submitted to the Committee on May 9th, 1924.

After hearing a statement on the origin and work of the Sub-Committee which had previously been appointed by the Provisional Health Committee, the present Commission of the Health Committee decided that the following were the main points for its consideration:

(1) Co-operation with corresponding malaria experts in countries where malaria is endemic;
(2) Enquiry into the incidence of malaria in infected countries;
(3) Investigation on the spot;
(4) World supply of quinine.

Other questions concerning epidemiology were raised and a certain number of points examined in this connection; it was, however, decided to postpone consideration of them until a later session.

1. *Corresponding Members.* — The Commission is submitting for approval by the Health Committee the following list of corresponding members, appointed by their respective health administrations:

Netherlands: Professor Swellengrebel,
Poland: Dr. Anigstein,
Roumania: Professor Ciuca.
Russia: Professor Marcinowski.
Kingdom of the Serbs, Croats and Slovenes: Dr. Sfarcic,
Ukraine: Dr. Roubashkin.

2. *Enquiry into the Incidence of Malaria.* — It was decided that the questionnaire previously drawn up and approved by the Commission should be sent immediately to the corresponding members through the health administrations of the various countries concerned. It will be accompanied by a covering letter. The enquiry will for the moment be restricted to European countries, but information might be asked for from various colonial administrations if necessary. Any modifications in the questionnaire intended to cover special local conditions should be as detailed as possible and should conform to its main lines, so as to allow of comparison of the data obtained.

3. *Investigation on the Spot.* — After hearing all particulars as to the Commission's detailed programme of travel — the trip will be undertaken next summer — the Commission approved the main lines of the scheme. It also decided that some of the corresponding members belonging to the countries visited should be invited to take part; the Commission's report on the trip will, however, be prepared only by the actual members of the Commission.

4. *Quinine.* — The Commissions considered a proposal made by Dr. Stampar (Kingdom of the Serbs, Croats and Slovenes) for an international conference on quinine. It was unanimously decided to adopt the proposal to convene a Government conference, without, however, fixing the date at the moment, as this will depend upon the state of the work undertaken by the preparatory committee of experts whose duty it will be to examine the question in all its aspects. It was decided to ask five experts to undertake this investigation: one each from Great Britain, Germany, France, the Netherlands and Italy. Each expert should have special qualifications for investigating a particular branch of the problem of the industrial production of quinine, *e.g.* from the botanical, chemical or pharmacological point of view. The terms of reference of the committee of experts were confined to the following points:

(*a*) Enquiry into the world requirements of quinine;
(*b*) Present production and means of increasing same;
(*c*) Development of the cultivation of the cinchona tree in new countries;
(*d*) Cost of production and sale price;
(*e*) Should quinine be distributed by the State or sold by private traders ?

Generally speaking, it was decided not to limit the study of these various points to quinine but to include all alkaloïd products of the cinchona.

It was decided to request Dr. Haigh to complete his investigation into malaria in Albania, regarding which a preliminary report has already been made, and to draw up resolutions and a scheme for a malaria campaign to be forwarded to the Malaria Commission, which will submit them to the Health Committee, the Council of the League and the Albanian Government.

5. *Report by Colonel James.* — It was decided to prepare proofs of the reports submitted by Colonel James, Dr. Hansen, and Professor Swellengrebel on malaria in England, Denmark and the Netherlands respectively and to ask Colonel James to collate them and to prepare a single report on the disappearance of malaria in these countries.

Annex 24.

ESTABLISHMENT OF AN EPIDEMIOLOGICAL INTELLIGENCE BUREAU IN THE FAR EAST

REPORT PRESENTED BY Dr. JITTA, CHAIRMAN OF THE COMMISSION APPOINTED TO CONSIDER THE REPLIES OF THE GOVERNMENTS.

Submitted to the Committee on May 10th, 1924.

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1. The Commission was informed that the following answers have been received from the Governments which were consulted as to the port in which the Bureau is to be situated:

(*a*) Great Britain, Singapore
(*b*) Japan, Singapore
(*c*) The Government of India, Singapore
(*d*) France, Cap St. Jacques
(*e*) Dr. Ricardo Jorge declared, on behalf of the Government of Portugal, in favour of Singapore.

The Governments of the United States of America and China, while expressing their approval of the establishment of the Bureau, did not desire to give any opinion as to the locality in which it should be situated, but the Commission understood that in the case of the United States of America there was no desire to press for Manila.

The Dutch Government requested the postponement of a decision in view of the necessity of further consultation with the Dutch Indies.

No replies have been received so far from New Zealand, Australia and Siam.

In view of the fact that the majority of the countries had sent a reply, and that it was necessary to reach a decision before the meeting of the Council of the League of Nations next June, the Commission was of opinion that a suggestion could be put forward, even at the present stage, as to the port which should be recommended.

2. The Commission found, therefore, that, of all the Governments that have answered, four have declared in favour of Singapore, one in favour of Saigon, and two were ready to accept the view of the majority.

The Commission then proceeded to vote on the proposals before it to which the Chairman added on his own behalf the port of Batavia. Dr. Raynaud voted in favour of Saigon, the Chairman favoured Batavia, while five other members voted for Singapore.

3. In view of the above result, the Commission proposes to the Health Committee that Singapore should be recommended to the Council as the port in which the Bureau is preferably to be situated. It is therefore proposed that the Governments of the Netherlands, Siam, New Zealand and Australia be informed of this recommendation and requested to cable their views regarding it before June 10th, *i.e.* the date of the next session of the Council.

Annex 25.

REPORT ON THE WORK OF THE OPIUM COMMISSION AND RESOLUTION

Adopted by the Committee on March 10th, 1924.

After discussing the proposals adopted by the Opium Mixed Sub-Committee, the Health Committee at its last session adopted a resolution which is given in full on page 40 of the Minutes of the session (C.10.M.7.1924.III).

In this resolution, the Committee, while noting that it was impossible to give with absolute precision any figure representing the legitimate requirements in regard to opium and opium derivatives, stated that the figure of 600 milligrammes of raw opium per head per annum adopted by the Mixed Sub-Committee was too high, and proposed that it should be reduced to 450 milligrammes; it was to be understood, however, that this figure should be regarded as a maximum and that, as it had been established solely on the basis of the estimates given by countries which have a highly developed system of medical aid, it could only be applied to countries in which similar conditions existed.

The Committee also decided to inform the Advisory Committee on the Traffic in Opium that, as regards the fixing of an average figure for the legitimate requirements of the various countries as regards narcotic drugs — the only question which, in point of fact, the Advisory Committee had submitted — it considered that its collaboration with the Advisory Committee was at an end, and it decided to postpone to a subsequent session the discussion of a number of other conclusions adopted by the Opium Mixed Sub-Committee in regard to special points which the latter had considered it desirable to examine during its discussions. Your rapporteur communicated the decisions of the Health Committee to the Advisory Committee on the Traffic in Opium.

Two requests, however, have since been made to the Health Committee. One of these came from the Chairman of the Committee appointed to prepare for the new Opium Conference, which is to meet in the autumn, and, in substance, amounted to a request that the investigations and the data in support of the figure of 450 milligrammes should be supplemented with a view to obtaining evidence which could be produced in support of this figure at the forthcoming Conference. In the other request, the Committee engaged in preparing for the Conference invited the Health Section to give details of the figure of 450 milligrammes and to prepare an estimate of the requirements per head per annum in respect of morphine, heroin and other dangerous drugs, with a view to the consideration of the possibility of limiting the manufacture of dangerous drugs. Accompanying the second of these requests was a detailed statement of the reasons which led the Preparatory Committee to apply for this estimate.

All these documents were distributed to the members of the Health Committee, who are doubtless acquainted with their contents, and, accordingly, it will probably be sufficient merely to indicate briefly their purport.

As the requests had been made in explicit terms, it appeared desirable that they should be submitted to the Opium Commission, consisting of Dr. Chodzko, Dr. Nocht, Professor Jorge, M. Velghe and Dr. Carrière, which was set up by the Health Committee at its last session. This Commission, it should be remembered, is entirely distinct from the Mixed Sub-Committee — appointed by agreement between the Health Committee and the Advisory Committee on the Traffic in Opium — on which the Health Committee is at present represented by Dr. Chodzko and Dr. Carrière. To avoid any misunderstanding, we think it advisable to add that, as this Mixed Sub-Committee had been set up by a decision of two technical organisations of the League of Nations, it could only be dissolved by a further decision of the two bodies in question, unless

either of them expressly intimated its desire to withdraw from the Mixed Sub-Committee. For the present, therefore, it is still in existence and will continue to consider the problems which the Advisory Committee on Opium may desire to submit to it, while the Commission of the Health Committee, which is dependent solely on the latter organisation, will act as its advisory body in regard to questions which the Health Committee may think it desirable, from its own point of view, to investigate.

The Opium Commission of the Health Committee has accordingly before it requests which this time are not made by the Advisory Committee on Opium itself but by the Committee engaged in the preparation of the forthcoming Conference. The Opium Commission considered and discussed these requests at two of its meetings with the assistance of Professor Knaffl-Lenz, and it arrived at the following conclusions, which it ventures to lay before the Health Committee.

In the first place it considered that the Health Committee could not adhere to its decision adopted at the last session, in accordance with which it was stated that, as regards the fixing of an average figure for legitimate requirements, it considered its collaboration with the Advisory Committee on the Traffic in Opium to be at an end. As the Preparatory Committee of the Opium Conference deemed it necessary to obtain further information to enable it to give the Conference satisfactory reasons for the figure of 450 milligrammes adopted by the Health Committee, and accordingly asked the latter to assist it in its task, your Commission considered that this request could not be refused off-hand and that the Health Committee should at least consider the possibility of supplying the information required. This view being accepted, the Commission agreed that it would undoubtedly not be very difficult to supplement to some extent the information given in support of the figure of 450 milligrammes. All that was required was to follow the procedure suggested by the Mixed Sub-Committee, which consisted in making use of the figures supplied by hospitals and sick-insurance societies in reply to the questionnaires which are reproduced on page 99 of the Minutes of the last session of the Health Committee (C. 10. M. 7. 1924. III). In the opinion of Professor Knaffl-Lenz, these additional investigations might be carried out without great difficulty and completed at a comparatively early date, the information accordingly being supplied to the Preparatory Committee in good time for its work. All that would be required — and this was a matter for the Health Section to take in hand — was to request the public health administrations of the various countries to send questionnaires to a few general hospitals selected by these administrations and, in the case of countries with sick-insurance societies, to such societies. Cocaine, in regard to which no accurate information has yet been compiled, might easily be brought within the scope of this enquiry. As cocaine is principally used in hospitals, information would no doubt be obtained without difficulty and would be more accurate than in the case of opium and its derivatives. Further, cocaine is mentioned in the questionnaires to which we have referred.

As regards this first point, the Commission accordingly proposes that you should accede to the Preparatory Committee's request.

In the second place, the Preparatory Committee asks for details as to the general figure of 450 milligrammes. In other words it desires to ascertain the proportions of opium (consumed as such) and of morphine, heroin, codein and other derivatives of opium which make up this figure. On examining this question, the Commission was forced to the conclusion that it was not possible at present to give a satisfactory answer. The figure of 450 milligrammes is derived from a synthesis of the general data obtained from the enquiries of the Commission; the figure which the Health Committee has recognised as a maximum was obtained by comparing these data, after rejecting those which appeared obviously erroneous, and by combining them. If, however, these data are examined in detail, *i.e.*, if attention is directed to the proportions in which opium and opium derivatives enter into these data, the enquirer is at once aware of the existence of considerable discrepancies which are to be explained partly by differences in medical practice in the various countries. Thus, some countries employ large quantities of certain products, while other countries practically make no use whatever of them. It is therefore not possible in this case to follow the method of comparison and synthesis and to draw up individual averages, which, when totalled, ought to give the general figure of 450 milligrammes. This procedure would lead to results which would certainly be artificial and arbitrary. The Commission therefore considers that such an investigation could lead to no accurate conclusions, and suggests that you should reply to the Preparatory Committee in this sense. As regards the second question which was submitted to the Health Committee, your Commission therefore proposes that you should reply that it is unable to supply the particulars required.

In bringing this report to a close, your Commission desires to draw your attention to the conclusions which have been submitted to you on behalf of the Mixed Sub-Committee on a certain number of points connected with the problem of dangerous drugs (heroin, cocaine, etc.). These conclusions, which are reproduced at the close of the report which I submitted to you during the last session (see Document C. 10. M. 7. 1924. III, page 97), are in our opinion of real importance. We also desire to call your attention to a statement by Professor Knaffl-Lenz, the conclusions of which are contained in our report, on the causes which lead to the abuse of opium and morphine and the methods of dealing with this abuse. You decided to postpone the discussion of these matters to a subsequent session.

We beg to suggest for the consideration of the Health Committee the following draft resolution:

> "The Health Committee:
>
> "After noting the conclusions reached by the Opium Mixed Sub-Committee which are contained in paragraphs II to V on page 97 of the Minutes of its first session (February 1924);

"Considering that these recommendations, besides raising certain problems of a purely administrative character, also raised questions of a medical and health nature which should engage the attention of the Committee, and on which it is important that the Committee should reach a decision after an examination of all the facts:

"Instructs the Opium Commission to submit these conclusions to careful study and to prepare a report for consideration at the next session of the Committee."

Annex 26.

INTERNATIONAL CONFERENCE FOR THE UNIFICATION OF HEROIC MEDICAMENTS.

Letter from the Belgian Ministry of the Interior and of Health to the President of the Health Committee.

Brussels, April 28th, 1924.

[*Translation.*]

In reply to your letter of February 10th last, I have the honour to inform you that the Belgian Government has decided to summon an International Conference at Brussels in 1925 for the unification of heroic medicaments.

Foreign Governments have been officially invited to take part in this Conference.

The Ministry which I represent proposes to insert, *inter alia*, in the agenda of that meeting the following two questions:

IV. Is it desirable to unify the chemical dosage methods employed in the case of certain medicaments ?

V. Is it desirable to employ, and to unify, biological dosage methods ?

The discussion of these two points will, it is hoped, provide an answer to the question which you put to me in your letter referred to above.

For the Minister:

(Signed) BIEBUYCK.
Deputy-Director.

C. 8. M. 6. 1924. III

LEAGUE OF NATIONS

HEALTH ORGANISATION

INTERIM REPORT

ON

TUBERCULOSIS AND SLEEPING-SICKNESS

IN

EQUATORIAL AFRICA

BY

ANDREW BALFOUR, C.B., C.M.G., M.D.,
Director of the Wellcome Bureau of Scientific Research, London.

E. VAN CAMPENHOUT, M.D.,
Director of the Public Health Service at the Belgian Ministry of the Colonies.

Professor GUSTAVE MARTIN,
Chief Medical Officer of the Second Class attached to Colonial Troops; formerly Head of the French Sleeping-Sickness Mission in French Equatorial Africa.

A. G. BAGSHAWE, M.D.,
Director of the Tropical Diseases Bureau, London.

being the Expert Committee appointed by the Health Committee, League of Nations, in 1922.

Submitted to the Health Committee at its Sixth Session, May 26th, 1923.

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* These maps are placed in the pocket of cower.

LETTER FROM THE COMMITTEE OF EXPERTS TO THE CHAIRMAN OF THE HEALTH COMMITTEE OF THE LEAGUE OF NATIONS.

Sir,

We, the undersigned Committee of Experts appointed by the Provisional Health Committee of the League of Nations on the advice of its Sub-Committee, have the honour to submit the following interim report.

1. The Committee met in London on two successive days, namely, on November 11th and November 12th, 1922.

There were present Dr. Andrew Balfour, Dr. E. van Campenhout and Dr. Gustave Martin.

Dr. Andrew Balfour was elected Chairman and, on his proposal, it was decided to ask Dr. A. G. Bagshawe, Director of the Tropical Diseases Bureau, if he would attend the meetings of the Committee and aid it in its deliberations. Dr. Bagshawe kindly consented to render this help and his services were accordingly co-opted.

At a later date (March 14th, 1923), Dr. Bagshawe was appointed one of the members of the Committee.

2. The Committee considered its terms of reference and found that its function was not only to collect information as regards sleeping sickness and tuberculosis in Equatorial Africa but also to make certain recommendations with reference to these diseases.

3. It was decided that, in the first instance, attention should be directed to the collection of information and that an epitome of the information obtainable should be prepared for submission to the Health Committee.

Accordingly, in the case of each disease, enquiries have been made as to : *(i)* its geographical distribution, *(ii)* the methods in force for its prevention.

So far as preventive measures are concerned, it was considered desirable to classify them as follows, at least in the final Report :

Disease	Preventive measures
Sleeping-sickness	*(a)* Administrative ; *(b)* Medical ; *(c)* Entomological.
Tuberculosis	*(a)* Administrative ; *(b)* Medical.

4. The term " Equatorial Africa " was taken to mean that portion of the African continent lying between the Tropics of Cancer and Capricorn and, as a result, the Committee was of opinion that its enquiries must be extended to the following countries :

The British West Coast Colonies,
French West Africa,
French Equatorial Africa,
The Spanish Territories of the Gulf of Guinea,
Belgian Congo,
Angola,
Portuguese East Africa,
Rhodesia,
Nyasaland,
Tanganyika Territory,
Kenya,
Uganda,
Anglo-Egyptian Sudan,
Abyssinia,
French Somaliland,
British Somaliland,
Italian Somaliland and Eritrea and the Islands of Principe,
Madagascar and Zanzibar.

5. A certain amount of information relating to the Belgian, British and French possessions was found to be immediately available, but for the purpose of adding to this information, and also with a view to obtaining particulars as regards countries belonging to other Powers, a letter was drafted and, after being approved by the Chairman of the Health Committee, copies of this letter were sent to all the authorities concerned.

Communications were also addressed to Professor Lyle Cummins, C.B., C.M.G., Professor of Tuberculosis in University College, Cardiff, South Wales, and, at the instance of Sir George Buchanan, C.B., to Dr. Sharp, of the British Colonial Service, Northern Nigeria, and formerly Physician to H.B.M. Legation at Adis Abeba, Abyssinia.

The former, a well-known authority on tuberculosis in Africa and elsewhere, was asked to indicate sources of information with respect to that disease; the latter was requested to furnish information regarding both sleeping-sickness and tuberculosis in Abyssinia. Both have been good enough to supply useful particulars.

At a later date, at Dr. Rajchman's suggestion, Professor Calmette was approached and he kindly referred the Committee to his work entitled *L'infection bacillaire et la tuberculose chez l'homme et chez les animaux*. At the same time a systematic study of the literature was undertaken.

6. Although, with the exception of the British Colonial Office, which has supplied certain important documents, no replies, beyond a note of acknowledgment from the Director-General of the Service of Health and Hygiene, Brussels, have yet been received from the authorities which were circularised, the Committee has collected a considerable amount of information, which it now begs to submit. The British South Africa Company was good enough to lend a series of medical reports on Northern Rhodesia.

7. It is considered advisable to deal in the first instance with the subject of tuberculosis.

In doing so, the best arrangement would appear to be a grouping of the different countries according to the nations governing them or responsible for them. This is specially desirable in the case of a consideration of the preventive measures in force and facilitates a comparison of the means employed by the various Powers concerned.

It is convenient to take first the French, Belgian and British possessions in the order indicated, as not only are they the most important but they are those concerning which we possess most information. The Portuguese, Spanish and Italian possessions will next be considered, and finally Abyssinia, about which very little is known.

Attention will be directed to German work in now mandated territories administered by France, Belgium or Great Britain.

There seems no object in going back much beyond 1912, save in some special instances. References to some earlier papers will, however, be given.

TUBERCULOSIS.

I. French Territories.

From these, fortunately, a good deal of information is forthcoming and this must in large measure be attributed to the stimulating influence of Professor CALMETTE, who, realising the importance of a study of tuberculosis, not only in Africa but throughout the French Colonies generally, arranged for an enquiry to be made in 1911 and 1912. So far as the African Colonies were concerned, the co-operation of

1. Military Medical Officers of Colonial Troops,
2. Medical officers of native " services d'assistance ", and
3. Personnel of Colonial Pasteur Institutes

was sought, and, as will be seen, the response was on the whole satisfactory.

To each correspondent were sent :

(a) A supply of tuberculin put up in large 40-dose vaccine tubes,
(b) Instructions, and
(c) Questionnaire.

The questionnaire asked for information as to :

(a) Frequency of tuberculosis observed,
(b) Forms of tuberculosis observed,
(c) Mode of feeding of young infants, and
(d) Frequency of bovine tuberculosis in the country.

A definite classification of results based on the age of subjects was recommended.

The Committee is fortunate in having access to a recent report by M. KÉRANDEL entitled *La Tuberculose chez les indigènes dans les colonies françaises*, submitted by Dr. Martin, which gives a short review of the state of matters as regards tuberculosis in the French Colonies in tropical Africa, which is largely based on the returns received by Professor Calmette.

The author states that it is difficult to say when or how the disease arose and that he finds a difficulty in accepting the view that its advent coincided with European penetration. He thinks that it has probably been introduced over hundreds of years into the Sudan by caravans crossing the Sahara, by Arabs from the Tchad district or by the Peuhls and Foulbés who are regarded as the original inhabitants of Upper Egypt.

The first medical men to visit the interior, participating in explorations or accompanying expeditionary forces, found cases of tuberculosis even in the most remote parts of the Sudan and Tchad. Undoubtedly it has encountered some obstacle to its development, for even to-day it is very rare in the interior. According to Calmette, the index is very low : in some places nearly nil, outside the large centres of population it does not exceed 5 to 7 per cent. Borrel did not find more than 4 to 5 per cent. amongst native troops recently recruited from different localities. In the towns and at certain places on the coast long occupied by Europeans the numbers are found to be slightly increased. Thus, in the case of persons over 15 years of age, there have been found infected 16 per cent. at Bamako, 23 per cent. amongst the Diolas of Casamance and 30 per cent. at St. Louis.

Leger has recently found in the schools at Dakar indices of 38 per cent. for children of 7 to 10 years and 49 per cent. for those of 10 to 15 years. These are the highest noted and are well below those of large towns in France, which amount to 80 and 90 per cent. The low figures cannot be satisfactorily explained in terms of the absence of alcoholism amongst a Mahomedan population, for in other countries where alcoholism is more or less in abeyance, as, for example, Algeria, the disease is rife. The hot, dry climate probably plays a part but cannot be the sole reason, because tuberculosis has made little progress in Dahomey or on the Ivory Coast, which are hot and damp. The presence of sub-acute forms of phthisis is certainly adverse to the transmission of the causative organism. Kérandel maintains that obvious signs of tuberculosis are not common amongst negroes in Africa and that bacilli are rarely found in their sputa. The native conditions of life in natural surroundings do not favour the spread of the disease. On the other hand, in the towns, the natives have changed their habits, which approximate to those of the Europeans and this, together with alcoholism, doubtless accounts for the greater diffusion of the disease.

Kérandel proceeds to consider the incidence of the disease in the various colonies. We take them in the order he adopts and supplement what he says regarding them by information culled from various other authorities, many of whom replied to the questionnaire sent out by Calmette.

(a) *Senegal.*

1. Senegal is the oldest French Colony in Africa and there tuberculosis is found to be most in evidence. Even so, however, the result of the specific skin reaction to tuberculin only shows an average of 15 per cent. infections *(vide infra)*. The most important foci are Gorée, Saint-Louis and especially Dakar.

2. Leger and Huchard (1922), who carried out a series of investigations on the cuti-reaction in children at Dakar found, as stated by Kérandel, a percentage of 38 in those from 7 to 10 years of age and of 49 for those from 10 to 15 years. These children had not been out of Senegal and had not been much in contact with Europeans in the town. They quote Noc and Huchard as showing that the disease is found in all its forms amongst natives who have never left the country.

3. Noc and Huchard (1920) cite Borrel as stating that there is a marked contrast between the villages in the interior where tuberculosis is rare and in urban centres containing Europeans where it is not infrequent. Out of 120 sputa examined from sick persons in the Central Native Hospital, they found 25 containing tubercle bacilli.

4. Bourret and Bourragé (1913), who applied the Von Pirquet test, found in Saint Louis itself 27 per cent. of the boys and 35 per cent. of the girls infected. In the suburbs the figure for boys and girls was 12.5 per cent. Amongst adults the percentage was 30. The pulmonary form was the most frequent and evolved with extreme rapidity.

5. Calmette (1912) summarises the tuberculosis indices from the Von Pirquet test for Senegal as follows :

	per cent.
Children 0 to 1 year	2.4
Children 1 to 15 years	17.8
Persons more than 15 years	15.2
All ages	15.1

6. Heckenroth (1919) finds that the inhabitants of Dakar tend to suffer from the ulcero-caseous form of pulmonary tuberculosis which, in them, takes the relatively benign form commonly seen in Europe. He attributes the marked susceptibility of the native of inland districts to the " absence of all chance of the relatively immunising previous contact " with the germ.

7. The comparatively recent work of Curasson (1919) on animal tuberculosis at Dakar merits attention. He has met with tuberculosis of the udder in native cattle, the bacilli being of the human type. In one case the cow came from a farm where a brother of the proprietor had recently died from tuberculosis.

Curasson has also signalised the presence of infection in pigs, having come across five instances of tuberculous retro-pharyngeal glands. Infection probably took place by way of the alimentary tract. It is noted that sausage makers use uncooked material from pigs but, as Heckenroth points out, natives do not eat sausages and the danger would chiefly affect Europeans.

8. Teppaz (1922) records a case of tuberculosis in a zebu at the slaughter-house of Dakar, the first example of bovine infection seen by him in the thousands of cattle he has examined both at Dakar and Saint Louis. The diagnosis was confirmed by guinea-pig infection and the bacilli were probably of human origin.

(b) *French Guinea.*

1. Tuberculosis is rare in this colony, while the mean percentage of the tuberculosis index is only 5 per cent. in those over 15 years of age. The pulmonary form is stated to be fairly common in the regions of Dittin, Timbo and Timbis. Hæmoptysis is infrequent Cold and inflammatory abscesses and testicular lesions ave been noted.

2. WAGON (1910) applied cutaneous and ophthalmic tests to 100 natives at Kindia. Of these, 12 gave a positive reaction, but, of these, 11 had been out of their own country and had been much in contact with Europeans. He notes contact with both Europeans and Syrians as a determining factor.

3. LEGER and PEZET (1922) came to the conclusion that tuberculosis has been manifestly increasing in Guinea during the past 10 years. At Conakry the index amongst children from 5 to 15 years has increased from less than 4 per cent. to 33 per cent. At Kindia, in 1910, it was 10 per cent. for adults. In 1922, it was 25 per cent. amongst school-children. The incidence, at least as shown by the Von Pirquet test, is obviously less high in Guinea than in Senegal, but the spread of the disease is as rapid in Guinea as in Senegal. In the interior of Guinea, the percentage of positive Von Pirquet tests is very small, being only 0.42 per cent. amongst children less than 15 years of age at Boké, Goleah and Mamou.

4. CALMETTE (1912) summarises the tuberculosis indices from the Von Pirquet test for Guinea as follows :

	per cent.
Children 1 to 15 years	1.6
Persons more than 15 years	5.0
All ages	1.8

(c) *Ivory Coast.*

1. According to Kérandel, the mean index is 8 per cent. of which Sorel gives 12 per cent. for Grand Bassam, and Arlo, 7 per cent. for the hinterland of Baoulé.

2. On referring to SOREL's paper (1912) we find, however, that he gives a figure of 20 per cent. for Grand Bassam, a seaport and a place where, as he says, imported alcohol is readily obtainable. At Moussu on the river, a village with railway facilities, the Von Pirquet test yielded 12 per cent. of positive cases, while at Bouaké, a place to which the railway had not been extended, the figure was only 2 per cent.

Sorel is of opinion that the natives normally do not readily acquire infection, but where they have become addicted to alcohol a higher tuberculosis index is found. This is apparent from the conditions in the coastal regions and those localities served by the railways, in both of which alcohol is easily obtainable.

3. CALMETTE (1912) gives the average index for all ages as 8.4 per cent.

(d) *Dahomey.*

1. KÉRANDEL states that the disease is fairly common on the coast and on the banks of lagoons but rare in the central and northern regions. (This agrees with Blin, who wrote in 1903.) He mentions that Bouffard does not entirely share this view and quotes the latter as saying in 1918 that tuberculosis appears to play a very slight rôle. Bouffard also states that tuberculosis of the glands, so frequent in early life, is not in evidence and that in the region of Grand-Popo the percentage positive of Von Pirquet tests is very small. Although alcoholism prevails, tuberculosis is very rarely observed in the three centres of Cotenou, Ouidah and Porto-Novo.

2. It is of special interest to note that CURASSON (1920) has found a race of cattle known as Lagunes in Dahomey, amongst which there appears to be a tuberculosis morbidity of about 33 per cent. The lesions from which they suffer are often generalised and Pierre and Pecaud have definitely proved them to be tuberculous. It is not a mere question of race, for other strains of African cattle brought into contact with the Lagunes are easily infected. The latter are badly stalled, under conditions favouring the spread of infection.

Fortunately this curious endemic is confined to a limited area, for there happens to be a zone of territory in which domestic animals do not live and which separates these infected cattle from other cattle regions.

(e) *Upper Senegal and Niger.*

1. Here, according to KÉRANDEL, tuberculosis is extremely rare throughout the whole extent of the territory.

2. On the other hand, LÉGER (1914), detailing researches carried out by the laboratory at Bamako, supplied the following figures relating to the Von Pirquet test :

	per cent.
Children 0 to 1 year	0
Children 1 to 15 years	12
Adults	17.7

Amongst adults the positive results for women (27.5 per cent.) were very high as compared with those for men (7.8 per cent.). Children of Moorish stock showed nearly five times as high an index as Bamako children, in whose case it was comparatively low.

It appears that recently Coppey at Bamako has encountered tuberculosis of the udder in native cattle, the bacilli being of human type.

(f) *Cameroons.*

1. KÉRANDEL states that statistics are not forthcoming regarding tuberculosis indices in the equatorial provinces. G. Martin and others, however, report that in the Cameroons pulmonary tuberculosis is rare. On the other hand, bone, joint and glandular tubercle is common enough and follows a chronic course, seldom becoming generalised and not appreciably affecting the general health.

Reference may here be made to earlier German work in the Cameroons.

2. LÖHLEIN (1912), as a result of his enquiries, agrees with Calmette that the disease occurs seldom amongst the natives of West Africa but runs a rapid course in them owing to their abnormal susceptibility to the virus. He imputes this lack of resisting power to a complete absence of that relative immunity acquired by the peoples of Central Europe.

3. ZIEMANN (1913) states that some tribes appear to be still entirely uninfected. In others the disease is rare. The likelihood of the disease being transmitted to the Duala tribe was said to be diminishing as almost all Germans were medically examined before leaving home and, as far as possible, tubercular cases were kept back. The Von Pirquet test was carried out, old tuberculin being used. In Bantus the average percentage of positives was 3.59 (in Bantu Highlanders 1.05) except in the case of adults who had visited Europe (50 %), and in lepers (nodular cases, 100 %; anæsthetic cases, 44.3 %. In this connection it should be noted that Manteufel *(vide infra)* regards the Von Pirquet test as unreliable in cases with a previous leprous infection.

For native-born Dualas the following figures are given :

	per cent.
½ to 8 years	2.3
8 to 16 years	3.4
Adult males	4.4
Hospital patients	4.6
Prisoners	6.6

In the case of Hottentots banished from what was then German South-West Africa the percentage was about 40.4. In Hausas it was 25 and in Syrians 42.3. These two

latter races are said to be to the West African natives what the natives of British India are to the East Africans *(vide infra)*.

It is to be noted that the Hausas and Hottentots have been associated for many years with Arabs and to some extent with Europeans. This had not been the case with Bantu Highlanders and Dualas. The Plehns reported that in the last century tuberculosis was very rare amongst the Dualas.

No tuberculosis was found by Ziemann in the indigenous Cameroon cattle, which are never stall-fed.

(g) *French Congo.*

1. KÉRANDEL points out that but little information as regards tuberculosis is forthcoming from this part of Africa, the energies of the medical staff having been directed to sleeping-sickness.

The disease is, however, noted as increasing in those centres where the natives live in contact with Europeans, *i.e.*, in seaports, along the big rivers and on trade routes. It appears to have existed there before the advent of the French and it is possible that it was introduced by the slave traffic. Old records, relating chiefly to the long-occupied region of Libreville, speak of tuberculosis as common amongst the natives and occurring in various forms.

2. SPIRE, however, in 1901 found cutaneous forms and lupus in the interior of the Gaboon amongst the Bakotas.

3. RINGENBACH noted glandular affections as common amongst children on the route from Loango to Brazzaville, while Morel, in 1903, observed cases of phthisis in Tchad. Recently the Belgian medical officers have noted with concern the progress of the disease in certain parts of the colony neighbouring on the French Congo.

4. There can be no doubt that in the latter, as elsewhere, tuberculosis progresses along with civilisation. It may be noted that GARNIER, writing in 1903, attributed the spread of the disease to the importation of Senegalese and Dahomeans. At that time he thought preventive measures were urgently required.

(h) *Madagascar.*

1. KÉRANDEL finds that tuberculosis has undoubtedly been present in the island for a very long time. It certainly existed before the French occupation. The disease remains localised on the central plateau and in some few centres on the coast colonised, amongst others, by Hovas, to whom the malady is almost wholly confined. Tananarive is the place most infected but even here the percentage mortality is two or three times less than in France. The index in children between the ages of 1 to 15 years is 13 per cent. The Betsilés are slightly infected, even at their principal centre, where reside a large number of infected Hovas. On the central plateau phthisis is the most common form, but other types of tuberculosis exist.

The coast tribes are almost exempt. The disease is nearly completely absent amongst the Bara people, although they possess many tuberculous cattle and consume large quantities of fresh milk.

In view of the above facts it is significant that the housing conditions amongst the Hovas are bad. They live in mud huts poorly lighted and ill ventilated, while the coast natives inhabit houses raised on piles and built of reeds through which air finds ready access. The Hovas also are dirty in their habits and spit all over the floors and matting. In Madagascar, therefore, tuberculosis appears to be closely related to the habitations and domestic hygiene of the people.

2. Loiselet (1913) has an interesting note to the effect that the prevailing organism appears to be of an attenuated type and is relatively benign both for Malagasies and for Europeans. On the other hand, the bacillus of European origin is very fatal to the Malagasy native.

3. Calmette (1912) gives the following figures as regards cuti-reaction supplied by Dr. Vaysse, at that time the Medical Inspector and head of the Government Sanitary Service :

	per cent.
Children, 0 to 1 year.	0.6
Children, 1 to 15 years	9.3
Persons over 15 years	7.1
Averages	7.0

4. Kérandel, in his conclusions finds himself in agreement with Calmette and Borrel, who note that a progressive immunity is developed by those races accustomed to live in infected areas. Tuberculosis occurs in very acute and severe forms amongst non-immunes, like the negroes of the Sudan and the Congo, when they are suddenly transferred to places where the disease exists. There is no indication of hereditary infection in the case of native children.

Save as regards Madagascar, bovine tuberculosis either does not exist or is very rare and, on this account and also because native infants are breast-fed, cow's milk does not play a part in the spread of the malady.

No race is immune. Neither climatic conditions, malaria nor syphilis can be said to play any definite part in determining the incidence of tuberculosis. Alcohol merely exercises an indirect influence by lowering bodily resistance, encouraging deficient nourishment, leading to poverty and favouring unhygienic surroundings of every kind.

The real factors at work are those operative in temperate climates, bad housing conditions, overcrowding and employments of a nature favouring the disease. As a result prophylactic measures must be similar to those in force in Europe but, of course, adapted to local circumstances.

It appears to be along those lines that the disease is being combated in the French African Colonies and in Madagascar, but information is not yet forthcoming as regards legislative measures which may have been adopted or as to what is actually being done to check the spread of tuberculosis.

5. Taking the French Colonies as a whole, a question of importance is raised by Lègendre (1922), who draws attention to the danger associated with the return of ex-soldiers of native races who have become infected with tuberculosis during service in France or in the occupied territories.

There can be no doubt that a grave responsibility rests not only on France but on Belgium and Great Britain in this respect. At the same time, so far as Equatorial Africa goes, France is chiefly concerned.

6. In this connection it should be noted that Hudellet (1921) has observed a decided increase of tuberculosis in Dakar since the war. He states that a large number of returned soldiers of African race have developed bony tuberculosis and as a result of these happenings he advocates the establishment of a tuberculosis dispensary on the lines of the Calmette Dispensary in Paris.

II. Belgian Congo.

1. Dr. van Campenhout reports that, at the beginning of the present century, human tuberculosis may be said to have been non-existent in the Belgian Congo. Of recent years, however, more and more cases have been reported, so much so that, in 1921,

legislative measures of a stringent nature were introduced. Some cases of tuberculosis have been reported in the Ruanda-Urundi district, but confirmation is required.

2. MOUCHET (1913) deals with the disease at Leopoldville where, in 1907, Rodhain found at the native hospital that 7.94 per cent. of deaths were due to tuberculosis. In 1908, the figure was 3.03 per cent., in 1909 it was 15.52 per cent. and, according to Houssian, 8.79 per cent. in 1910. Mouchet himself, between April 1st, 1911, and September 30th, 1912, found 36.71 per cent. of infections in a series of 79 *post mortems*. Almost all the labouring population attend this hospital, so that the figures are exact for the locality. It is important to note that in many instances the diagnosis during life had been dysentery or pneumonia. Sputa are rare and hence tubercle bacilli are rarely found. Pulmonary lesions are the most frequent. They are of an acute type and diffused throughout the lung tissue. Intestinal lesions come next and their comparative frequency is attributed to the native custom of swallowing sputum and not expectorating. Miliary tuberculosis came third in frequency. Leopoldville constitutes a focus of the disease which is of recent origin and localised. The Von Pirquet reaction was applied in the case of 359 labourers. It was positive in 7 per cent.

At Dolo, an agricultural place distant 10 kilometers from Leopoldville, the index was only 1.4 per cent., at Baiza, a village 2 ½ hours march from Leopoldville where no Europeans live and which is rarely visited by them, it was 1.03 per cent. Bovine tuberculosis does not exist.

Mouchet remarks that the only possible prophylaxis consists in obeying the ordinary rules of hygiene and increasing resistance to the disease by providing good houses and suitable food.

3. This author, together with PEARSON, has recently produced an excellent book entitled *Practical Hygiene of Native Compounds in Tropical Africa*. Part of one section deals with tuberculosis as met with at Katanga and the following extracts are taken from this work :

> " Tuberculosis among natives is a very serious matter, since it is a disease to which they have as yet acquired little or no immunity.
>
> " The first case noted in the Katanga was in August, 1912. No case was seen during more than nine years previous to this.
>
> " The occurrence of cases since 1912 has been as follows :

Year	Cases	
1912	2	
1913	1	
1914	3	(in first three months only)
1915	6	(including 2 natives not on strength)
1916	13	
1917	18	
1918	6	
1919	3	
1920	9	"

Taking as their text the statement by Rodhain written in 1909, which runs as follows :

> " The most salient feature is the large number of cases of tuberculosis which we have observed under various forms. The disease has been introduced from Europe and is very fatal to the negro, so that in a few years it has grown to occupy a position of importance in the death-rate of the district "

the authors state :

> " With the object of averting a similar condition of things the Government was approached by us in 1915 with the suggestion that Europeans affected by

tuberculosis should not be employed in the Katanga, more especially if their position brought them into contact with natives. This suggestion was strengthened by the observation which has been made that cases of tuberculosis among Europeans did not do well there, probably on account of the association with malaria.

" An understanding was arrived at that this suggestion should be adopted, and the policy has since been followed in a somewhat spasmodic manner. "

They further comment upon the virulence of the disease and state that this very feature possibly has some share in preventing its widespread occurrence under the conditions present in the compounds in their care. The native with active tuberculosis remains but a very short time outside the hospital. They are inclined to think that infection up to the present may have taken place chiefly in the compounds. Its appearance in the villages in any locality where the population is considerable will, they say, probably be followed by a state of affairs similar to that noted round Leopoldville. They comment upon the dangers of recruiting in an unknown district, which may result in the introduction of infected natives. They lay stress upon early diagnosis and isolation from other natives as the chief measures to be adopted for preventing the spread of the disease in the compounds.

In an informative article on the pathology of the disease, they give the following list showing the distribution of the lesions in the case of 72 autopsies :

Pulmonary tuberculosis	54
Pleural	8
Intestinal	26
Renal	3
Hepatic	3
Splenic	4
Laryngeal	1
Peritoneal	3
Cardiac	2
Pericardial	1
Osseous	2
Meningeal	1
Tuberculous meningitis	6
Peripheral glands	3
Miliary and generalised	27
Hæmoptysis	1
Pneumothorax	2

This list is here reproduced as it demonstrates the predominance of the pulmonary form and also shows that the intestinal and miliary types are by no means infrequent.

4 The legislative measures which have been mentioned are based upon three methods of prevention :

(*i*) The prevention of the entry into the Colony of all " infective " cases of tuberculosis, and

(*ii*) The obligatory notification of all cases of tuberculosis with classification as follows :

(a) In the non-indigenous, medical supervision, with compulsory measures of prophylaxis and, in the case of " infective "tuberculosis, an obligation t o quit the Colony within a maximum period of six months.

(b) In the indigenous, visits and compulsory notification, medical supervision, directions as to place of residence and measures of prophylaxis, together with registration of cases and a statement as to type and their progress.

(*iii*) The inspection and control of flocks and herds and regulation of the sale of products liable to be contaminated, such as milk, etc.

5. Copies of the following legal documents have been submitted to the Committee by Dr. Van Campenhout :

1. Royal Decree of January 20th, 1921, dealing with tuberculosis.
2. Ordinance of the Governor-General of the Belgian Congo of August 7th, 1921.

Dr. Van Campenhout also submitted examples of the type of letters which have been addressed by the Minister for the Colonies to all commercial houses, missions and corporate bodies.

(*a*) An English translation of the Articles of the Royal Decree is here given :

Article 1. With a view to combating human tuberculosis, the Governor-General shall lay down regulations determining the measures to be taken for preventing the introduction into and the spread within the territories of the Colony of this contagious disorder.

He may make entry into the Colony contingent upon the production of medical certificates ; impose medical inspections and special measures of disinfection ; determine the conditions to be complied with by dwellings and public meeting-places ; order treatment in State hospitals ; exact compulsory notification of the malady ; and cause the repatriation of non-Congolese persons overtly infected with tuberculosis.

Art. 2. Non-compliance with such regulations shall be punishable by penalties not exceeding three months' penal servitude and a fine of 1,000 francs or by one of these penalties only.

Art. 3. Our Minister for the Colonies is charged with the execution of this Decree.

We also include an English translation in a slightly abridged form of the above-mentioned Ordinance, together with copies of the two letters to which reference has been made.

(*b*) Belgian Congo.

Measures to be taken to prevent the spread of Tuberculosis.

By Decree of the Governor-General dated August 7th, 1921.

Article 1. No person not of Congolese nationality may enter the Congo Colony for purposes of residence there unless he is furnished with a duly authorised medical certificate emanating from a qualified medical practitioner of his country of origin or of that where he has last resided showing that he is free of all obvious signs of tuberculosis.

This certificate must have been given within the three months preceding the date of entering the territory.

In default of such a certificate its place may be taken by another one provided by a Medical Officer resident in the Colony. In this case it must be obtained within 48 hours after arrival, but if no Medical Officer lives in the place, the period will be extended to that absolutely necessary for obtaining one from the Medical Officer at the nearest post.

Art. 2. Any person found with obvious signs of the disease may return to the Colony to wind up his affairs during a period of six months if he has been unable to do this since the time that his further residence in the Colony was forbidden.

During his stay he must submit to the measures of prophylaxis and disinfection detailed in Art. 8.

Art. 3. Anyone of Congolese nationality who has been out of the country, no matter for how long, must on his return submit, within the period already fixed *(viz.* 48 hours) to a medical examination by the nearest Medical Officer. If he is found free of obvious signs of the disease, he will be furnished with a certificate to this effect.

Art. 4. Any traveller passing through the Belgian Congo must be furnished with a similar certificate. If the duration of his journey in the Colony is less than 60 days, he may proceed even if he is tubercular, but he must conform during his stay in the territory to the prophylactic and disinfective measures detailed in Art. 8.

Art. 5. Any traveller infected with definite tuberculosis who is allowed to pass through the Colony may not stay more than 30 days at the same place unless he submits himself to examination by a Government Medical Officer or the nearest Medical Officer approved for the purpose.

Art. 6. The medical certificate must be shown on demand of either a medical or territorial authority, the head of a registration office or any other person nominated by the Vice-Governor-General of the Province to supervise the carrying out of Arts. 1, 2, 3 and 4 of this Ordinance.

Art. 7. Anyone attending the Medical Officer for the purpose of obtaining a certificate as detailed in the previous articles must submit to any necessary clinical and microscopical examination and to one at least of the tests employed.

Art. 8. Everyone who is not of Congolese race residing in the Belgian Congo and found with obvious tuberculosis must quit the territory of the Colony within six months of the establishment of the diagnosis. This period may be extended by the Vice-Governor-General of the Province. Up to the frontier he will travel on an indicated route and while awaiting departure and during any movement connected therewith he will attend scrupulously to the following measures of prophylaxis and disinfection.

(a) As regards the dwelling : To cleanse by means of antiseptic solutions and aeration the dwelling, which should not be a material part of a structure occupied by others ; to allow none (except wife or husband) to sleep in the same room : to fumigate daily by means of substances supplied for this purpose by the Medical Officer.

(b) As regards clothing and linen : To sterilise them by boiling or in a 5 % solution of copper sulphate.

(c) As regards secretions and excretions : To receive such in special receptacles containing 2 % carbolic or 1 °/₀₀ sublimate, or lysol or creolin, or oxyl, or any other product of similar nature at 10 % strength : to burn all dressings.

(d) As regards plates, dishes and other eating utensils : To disinfect by boiling water.

If the sick person does not carefully observe these prophylactic measures, or when the Medical Officer considers his state demands it, he may be ordered into hospital.

Art. 9. Any person not of Congolese race suffering from tuberculosis of a non-communicable character may reside in the Colony on condition he submits to examination at least once every six months by a colonial or approved Medical Officer.

Art. 10. Any person of Congolese race suffering from definite tuberculosis must submit to such of the regulations on prophylaxis mentioned in Art. 8 as may be required of him by a medical authority.

Art. 11. It is forbidden for any Congolese suffering from tuberculosis to leave his home without medical permission.

Tubercular Congolese who wish to return to their places of origin may be authorised to do so. They must, however, submit during their journey to the prophylactic and disinfecting measures mentioned in Art. 8. They must establish themselves in a place assigned to them by the Medical Officer of their country of origin and submit to Art. 8. If a Medical Officer authorises a tubercular person to reside in another district, he must notify the Medical Director of that district and the chief Medical Officer.

Art. 12. Non-infective tubercular subjects of Congolese race will be examined from time to time. Should the disease become infective in nature, the patients must conform to Arts. 10 and 11.

Art. 13. Everyone, no matter of what race or sex, residing or travelling in the Belgian Congo is obliged, when required by an authorised demand from a Medical Officer of the Colony, an approved Medical Officer or any other Medical Officer designated by special decree of the Vice-Governor-General, to submit to a compulsory examination from the special point of view of tuberculosis. For those not of Congolese nationality the demand will be a personal one ; for those of Congolese nationality it will be issued collectively.

Art. 14. The examination will be as detailed in Art. 7.

Art. 15. Demands to submit to examination will be in accordance with the attached model form (Model III).

Art. 16. Anyone found with disease of an infective nature after examination is subject to the treatment judged suitable by the Medical Officer, or is to be hospitalised in a hospital, sanatorium or segregation camp. Submission to all details in Arts. 8 and 10 is necessary.

Art. 17. Every medical authority, also any Medical Officer not in Government employ who diagnoses a case of tubercle either of infective or non-infective nature, whether by clinical examination, by any reaction, or by autopsy, must send a written report as soon as possible to the nearest Colonial Medical Officer, who will forward it to the Medical Inspector of the Provincial Medical Service. Each report shall deal with one tubercular person only (Model I [1]). All deaths of tubercular subjects will be reported to the Medical Inspector, Chief of the Medical Service of the Province.

Art. 18. A sick person suffering from tuberculosis of either infective or non-infective type, on becoming aware of his ailment, is required to notify a Medical Officer of the fact. Any person of whom the patient is a dependent or by whom he is nursed or with whom he resides is also required to make such notification.

Art. 19. The Medical Officer will notify the recovery (or healing of lesions) of all tubercular patients when occasion arises.

Art. 20. In each district a special register (Model II [1]) of tuberculous cases will be kept by the Medical Director.

Art. 21. All records, reports and registers concerning tubercular cases are confidential and may only be consulted by Medical Officers of the Health Service.

Art. 22. If the public health is menaced by tubercular animals amongst herds, the Commissioner of the District on medical or veterinary recommendation may prohibit the sale of milk and milk products. Establishments which sell contaminated products, such as dairies, etc., may be closed.

Art. 23. When a tubercular person changes his house or dies, the attending Medical Officer or the proprietor or occupiers of the house where he lived, or the employer, must

[1] See Appendix.

notify the Government Medical Officer or the territorial authority within 24 hours. The room or place vacated may not be reoccupied until cleansed and disinfected.

Straw huts and mud houses will be destroyed by fire ; other habitations will be disinfected by means of carbolic acid 2 %, sublimate 1 °/₀₀, lysol, creolin, oxyl or other similar compound at 10 % strength or by chloride of lime.

Art. 24. Clothing and personal objects (linen, crockery, pipes, wind musical instruments) belonging to a tuberculous person may not be sold, given away, or handed over to heirs until after disinfection.

Art. 25. In detention houses and hospitals tubercular cases with infective lesions will be isolated. Each time a cell or room is occupied by such a patient, it will be disinfected on his leaving. The same disinfection will be carried out for cabins on steamers, railway carriages, hotel rooms and any other place which has been occupied by a tubercular person.

Art. 26. Entry to schools is forbidden to instructors, scholars or employees who suffer from infective tuberculosis.

Art. 27. Government Medical Officers may inspect any house whatever if they have reason to suspect it is or has been occupied by a tuberculous person and examine all the inmates from the point of view of the disease. They also have power to fumigate with sulphurous acid.

Arts. 28-33. Detail medical authorities for purposes of the Act ; lay down penalties for infringements ; state that treatment for natives and hospitalisation for them and all necessary laboratory diagnosis are free of charge. Destruction of houses, etc. does not give any claim to compensation, but Vice-Governors-General may assess any compensation according to circumstances of each case.

(*c*) Letters issued to companies, missions and corporate bodies.

1.

Sirs,

I have the honour to transmit to you, attached hereto, copy of the Order on the Prevention of Human Tuberculosis, issued by the Governor-General of the Congo in application of the Royal Decree of January 20th, 1921.

I would draw your attention to the obligation which is incumbent upon every person not of Congo origin to obtain, before his entry into the Colony of the Belgian Congo, a medical certificate in accordance with Article 1 of the above-mentioned order.

I have the honour to be, etc.

For the Minister,
The Secretary-General.

(Signed).....

2.

Sirs,

Following on my letter of December 1st, 1921, No. 1375, (Application of the Order for the Prevention of Human Tuberculosis,) and in accordance with the opinion given by the Governor-General of the Congo, I have the honour to inform you that, for the purpose of legalising medical certificates, you may cause the signatures of the visiting doctors to be certified in the Congo itself.

The signatures may be certified at the frontier posts at which your agents usually enter the territories of the Colony and where there is a registration office (see the Annual Official Records).

I have the honour to be, etc.

For the Minister,
The Secretary-General.

(Signed) .....

NOTE. — The following recent figures are now available from the Belgian Congo : 1921. One death from tuberculosis among Europeans. Eighteen deaths from tuberculosis, out of 233 treated, among natives in hospitals or under treatment in quarantine stations or dispensaries.

III. British Territories.

In the various British possessions and the territories for which Great Britain is the Mandatory Power, there has been no systematic enquiry similar to that which has been carried out in most of the French African Colonies, but there is frequent reference to the disease in the Annual Reports from the various Colonies and Protectorates. Some information regarding it is also forthcoming from the Anglo-Egyptian Sudan.

In the case of Tanganyika Territory, research work of the kind conducted in the French possessions was prosecuted by the Germans when that country was under their dominion and the records are available.

(a) *Gambia.*

Reference is made to the disease in the report for 1919, where it is stated that the disease has been introduced by Europeans amongst a community highly susceptible to it. One of the principal industries is concerned with the ground-nut, *Arachis hypogea*, and it is said that the dust from this product is very fine and irritating and predisposes to infection. Comment is also made upon the unhygienic conditions under which the natives live and especially to the lack of ventilation in their houses.

(b) *Sierra Leone.*

The following table has been compiled from the reports available since 1912.

Year	Cases	Deaths		Mortality per cent.
1912	86	(?)		(?)
1913	112	12		10.7
1915	109	(?)		(?)
1916	108	(?)		(?)
1918	65	(?)	(out-patients only)	(?)
1921	116	19		16.4

The disease is said to be probably more widespread than is recognised. Kru boys visiting England in ships become infected there and form foci of infection. Although Freetown shows the highest incidence, the figures are not reliable, as natives residing in the town seek medical advice, whereas those in other places are much more negligent in this respect. The majority of cases are of the pulmonary type and the infection is virulent and usually runs a rapidly fatal course. In 1916 eight cases occurred amongst prisoners. A recommendation which had been made that a segregation ward should be provided for such cases was not adopted. The individual cell system of incarceration does, however, afford a makeshift means of isolation. The evidence that the disease is increasing in the Colony is doubtful but mention is made of the ill effects of the great epidemic of influenza (1917-18) on those suffering from tuberculosis.

(c) *Gold Coast.*

The following table has been compiled from the reports available since 1912.

Year	Cases	Deaths	Mortality per cent.
1912	135	13	9.6
1913	141	15	10.6
1914	272	21	7.7
1915	276	19	6.8
1916	283	25	8.8
1917	261	(?)	(?)
1918	239	(?)	(?)
1919	269	(?)	(?)
1920	355	36	10.2
1921	336	41	12.2

There seems to be a general consensus of opinion that the disease is on the increase, though it must always be somewhat difficult to say how much of this increase is really due to improved methods of registration bringing more cases to light. At the same time the later reports certainly indicate a true increase in the number of cases. In the more important centres of population there would also appear to be an increase in the virulence of the infection.

In 1917 tuberculosis was declared an infectious disease under the Infectious Diseases Ordinance and its notification by all Government medical officers was made compulsory. Supervision is now exercised over all cases notified ; houses and clothing are disinfected and disinfectant supplied for cuspidors. Patients are warned of the danger to relatives and other contacts and special lectures on the disease and its prevention are delivered by the sanitary inspectors.

It is found, however, that most of the cases die undiagnosed and are not recognised until application is made for burial permits. It is unfortunate that the onset is frequently very insidious and lacking in acute symptoms, so that it is not until some alarming symptom supervenes that medical advice is sought.

In the 1918 report reference is made to the prevalence of the disease in the mines. The medical officer of one of the mining companies opened an isolation building for the treatment of cases.

The 1919 report speaks of a register being kept at each station where there is a medical officer and of a schedule of enquiry which is employed when a case is reported. A search for other cases is made but no attempt is made to enforce segregation if objection is taken to that measure.

Treatment at Government dispensaries and hospitals is free.

It should be noted that compulsory notification is not general. It applies only in the case of Government medical officers.

The report for 1921 lists the preventive measures in force as :

1. Notification.
2. Isolation of certain cases in an infectious diseases hospital or on the verandah of a general native hospital.
3. Disinfection and white-washing of premises.
4. Issue of informative leaflets in the vernacular.
5. Following up of cases with a view of exercising personal influence and of finding others in early stages of the disease.

6. Supervision of building construction to ensure improved ventilation and light in dwellings.

A schedule of enquiry and details of cases are kept for future reference.

Laboratory investigation has shown that cockroaches devour sputum greedily and excrete from their bodies tubercle bacilli which they have ingested. These bacilli are alive and virulent and capable of infecting animals.

All the evidence goes to show that bovine tuberculosis is rare. Thus, in Accra during 1920 only 9 cattle out of 1993 and 1 pig out of 2763 were found infected.

(d) *Nigeria.*

Northern and Southern Nigeria were united under one administration in 1914 and the following figures are taken from the reports published since the amalgamation :

Year	Cases	Deaths	Mortality per cent.
1914	109	(?)	(?)
1915	168	40	23.8
1916	181	(?)	(?)
1917	178	4?	(?)
1918	140	34	24.3
1919	188	43	22.9
1920	257	50	19.4
1921	273	62	22.7

The disease is stated to be making slow but steady progress and to be much more prevalent in the southern than in the northern province. In the former it is more common on the coast than inland and most prevalent of all in Lagos.

In one of the earlier reports (1914), the remark is made that little can be done to check the spread under existing conditions and the view is expressed that open-air treatment and generous feeding would be beneficial. The insanitary conditions of native life are cited as important predisposing factors and, as far as Lagos is concerned, the construction of model buildings is urged, together with improvements in water supply, drainage and sewage disposal, destruction of refuse and proper town-planning.

In the 1915 report, there is a note to the effect that education alone can be of real efficacy in the prevention of the disease, which in Lagos is stated to be of a most virulent type. The necessity for the provision of accommodation for the treatment of prisoners is pointed out.

In the 1917 report the important observation is forthcoming that the disease is appearing amongst the Arabs of the North, amongst whom until quite recently it was, so far as can be discovered, unknown. Familial infections have been noted in Northern Nigeria.

A conference on the increase of the disease took place at Lagos, when it was held that isolation was not practical and the statement was made that notification had not been carried out. The Registrar of Vital Statistics informs the Medical Officer of Health of deaths certified as due to tuberculosis and furnishes the addresses. The Medical Officer of Health then inspects, disinfects the house, advises as regards ventilation and takes action under the Public Health Ordinance as regards damp, ill-ventilated dwellings and overcrowded premises (vacant floor space less than 30 square feet or cubic space less than 300 cubic feet per adult or two children under ten years of age).

Other measures recommended were :

1. Notification.
2. Microscopical examination of specimens at Medical Research Institute.
3. Education and distribution of leaflets, especially to schools.
4. Appointment of Health Visitors. Appointment of a woman Sanitary Inspector advocated.
5. Housing improvement. Provision of new native locations in neighbourhood of Lagos (that at Apape already in hand).

(e) *Rhodesia.*

1. *Southern Territory.*

In the Annual Medical Report for 1912, the following statistics are given as regards phthisis amongst natives employed in the mines :

Number employed	Total sick	Total deaths	Cases mortality
34,494	132 (3.83‰)	63	47.43%

It is also stated that phthisis and other forms of tuberculosis amongst Europeans would appear to be slightly on the increase. A large proportion, however, were imported cases and pulmonary tubercle cannot be said to be a disease which primarily attacks Europeans in Southern Rhodesia. On the other hand it seems to be gaining a hold upon the native races.

For 1913 statistics of the same type as those above quoted are given.

Number employed	Total sick	Total deaths	Case mortality
33,543	192 (5.72‰)	62	32.29%

The report for 1916 does not indicate that there has been any marked spread of the disease amongst the native population. As regards miners' phthisis, we have the following figures :

Number employed	Total sick	Total deaths	Case mortality
37,928	61 (1.61‰)	48	78.69%

To judge from other reports, pulmonary tuberculosis is the most common form. The miners' phthisis figures for 1920 and 1921 may be compared :

	Number employed	Total sick	Total deaths	Case mortality
1920....	37,669	71 (1.88 °/₀₀)	48	67.72%
1921....	37,605	130 (3.42 °/₀₀)	39	30

It must be remembered that many of these natives come from other countries, more especially perhaps Portuguese East Africa, Northern Rhodesia, and Nyasaland.

In the 1921 report there is a note to the effect that, at the Public Health Laboratory, 46 examinations of material, comprising sputum, urine, pus, tissues and cerebro-spinal fluid, gave 8 positive results as regards the presence of tubercle bacilli. These were all cases of phthisis.

On the whole, the disease still appears to be comparatively uncommon.

2. *Northern Territory.*

The report for 1913-1914 states that there is good ground for believing that until very recently the disease was unknown amongst the indigenous population. Unfortunately the existing conditions favour its introduction and spread. These are freer communication with the South, changes in habits and clothing, and exposure to unhealthy conditions.

A few natives suffering from phthisis having been found amongst those repatriated after labour in the southern mines, measures for segregation are recommended, preferably in the territory in which the infection was contracted, but it is admitted that this would be difficult to arrange.

In the more remote regions as, for example, Fort Jameson, the disease is very infrequent amongst natives.

This is also true, even at the present time, as regards the indigenous population as a whole. The fears of spread mentioned in the earlier reports do not appear to have been justified, possibly because the inhabitants live for the most part under conditions inimical to the diffusion of infection.

(f) *Nyasaland*

The following table has been compiled from the reports available since 1913 :

Year	Cases	Deaths	Mortality per cent.
1913	32	(?)	(?)
1914	10	(?)	(?)
1915	16	3	18.7
1916	13	0	(?)
1917	14	(?)	(?)
1918	9	1	11.1
1919	24	5	20.8
1920	17	6	35.3
1921	28	7	25

The report for 1912 states that pulmonary tuberculosis is comparatively rare amongst natives of the Protectorate but is gradually being introduced into the country from South Africa by natives returning from the mines. An examination of three batches of repatriates gave the following figures :

	Number examined	Positive	Suspicious
(1)	50	4	2
(2)	24	3	3
(3)	23	3	3

It would appear that the larger proportion of cases is localised in the Zomba, Marimba and Blantyre districts

(g) *Tanganyika Territory.*

1. So long ago as 1910, PEIPER took up the question of the spread of tuberculosis in what was then German East Africa after observing several cases of rapid phthisis at Kilwa. His first paper on the subject is of special interest inasmuch as he reviews the literature to date on the disease among African natives, citing especially Hubers as regards Abyssinia, Kermorgant and d'Anfreville with reference to the French Colonies, and Vortisch with respect to the Gold Coast. He concludes that the disease proceeds inwards from the coast in proportion to the advance of civilisation, the increase in the abuse of concentrated alcohol, poverty, moral and physical degeneration and the lack of any inherent resistance to it on the part of the natives. The victims are said to increase annually. Peiper applied the Von Pirquet test, using a modification of his own which he considered better adapted to native conditions. This is described and it is pointed out that concentrated tuberculin should be used. Tables are furnished showing reactions in various groups at Kilwa. Indian positives were found to exceed native positives. Europeans as a source of infection are believed to be negligible. The Goanese are a source of danger but the chief source of infection are the Indians.

Hygienic and preventive measures on the usual lines are indicated, the former to be directed principally against the Indian population and to be supplemented by preventing the entry of infected immigrants.

Peiper, in his second paper (1912), gives tables from the Annual Medical Reports from 1903-1904 to 1910-1911 and from the Reports on the Colonial Imperial Force, showing the increase in the number of cases and the heavy incidence in the coast towns.

Mention is made of the rapid and generally fatal course in natives, the aggravating effects of malaria, ankylostomiasis and schistosomiasis, and the need for isolation facilities. It is noteworthy that native troops, though under constant medical supervision, supplied cases nearly every year with a high proportion of deaths.

According to Peiper, the disease was absolutely unknown amongst the native population and was introduced into the country chiefly by the Goanese and Hindoos. He declares the climate to favour a very rapid and fatal course — an advantage from the point of view of transmission. The clinical forms recorded are scrofulosis, pulmonary tuberculosis, tubercular swelling of the cervical glands, laryngeal tuberculosis, swelling of legs, genital organs, abdomen and face, swollen thigh glands, advanced pleurisy with caseous induration and caries of the vertebral column, tuberculosis of the peritoneum and general miliary tuberculosis.

A third paper by this author in 1914 testifies to the value of the Von Pirquet test, which he says has enabled the source of the scourge in the colony to be traced to infected Hindoos.

He notes that, since January 1913, an imigration law has been in force which provides for the medical examination of all immigrants, and an infectious diseases law under which the disease is notifiable. He further states that for many years an official examination of meat has been carried out in the larger towns of German East Africa and that this practice has been extended.

In yet a fourth paper, published like the third in 1914, Peiper speaks of the slow but sure progress of the disease and the special liability of chained prisoners (generally persons of low moral standard and physique, from filthy surroundings) is noted. He contrasts the naturally cleanly habits of the negro populations with the unhygienic conditions under which the Indians live. In this paper he speaks of the influence of Arabs and Somalis in introducing and extending the disease, but still regards the Hindoos as the principal offenders. The question of prophylactic measures is fully considered

and, in addition to the usual recommendations, he advocates the deportation of all tubercular would-be immigrants who have not acquired German nationality.

2. MANTEUFEL (1914), in a pessimistic paper, points out that, while efforts should be made to carry out the recommendations of Peiper and Ziemann, these would require time, and urgency is all-important if the colony is not to be reduced to the state of massive infection which prevails in Germany and other places and renders a wholesale attack upon it hopeless.

He states the the pulmonary form is by far the most prevalent, developing in to phthisis with cavity formation. Its course in the native is more rapid than in the European or the Hindoo. The only probable source of infection is tubercular sputum containing the causative bacilli. Lupus has never been observed.

He comments upon the fact that Greeks and Syrians are little more advanced in hygiene than the Indians.

He believes the Von Pirquet reaction to be unreliable, as it may be influenced by previous leprous infection and has often proved negative in bacteriologically certified cases. His own tests among Germans in the colony gave a higher percentage of positive results than those of Peiper amongst Indians so, though he, like Peiper, considers the Indians the most dangerous of possible sources of infection, he bases his judgment rather on their unhygienic habits than on their Von Pirquet reactions.

He considers that only evident sufferers from pulmonary or laryngeal infection should be taken into account in prophylaxis. These, he says, should be forcibly isolated in hospitals or in tuberculosis villages until all symptoms of the disease have disappeared. He recommends that Europeans and others not amenable to colonial authority who refuse to be treated should be expelled from the country. As regards the Indians, he thinks that further immigration should be prohibited ; failing this, no precautionary measures can be of the slightest use unless they include a properly equipped quarantine station where all immigrants, not provided with a satisfactory certificate from an official medical officer, would be placed under observation for a specified number of days. Infected cases should then be returned to their place of origin.

Natives are said to bear the Koch old-tuberculin treatment well, but their habit of running away as soon as any improvement is noticeable makes it impossible to say whether advanced cases could be permanently cured by this treatment. Manteufel thinks that it should certainly be employed if legal measures are ever taken to keep patients in hospital until they cease to harbour the bacillus.

3. WÜNN (1914) recorded his observations in the Kilimanjaro district, where the disease, he says, is on the increase. The natives there are liable to respiratory troubles, owing to the prevalence of cold and fogs. Tuberculosis introduced by Indians and Europeans has found them an easy prey. Many of the Wadschagga are infected and transmitting the disease, the spread of which is favoured by the housing conditions.

The establishment of a tuberculosis hospital is advocated. It would certainly appear that, towards the close of the German occupation, tuberculosis had made great headway and had constituted itself a very serious problem.

4. No information of any great value regarding it is available for the period of the war, but brief references to it are forthcoming in the two Medical and Sanitary Reports which have been issued since the territory passed into British hands.

The first of these reports, which is for the years 1918-1920, wellnigh ignores the disease, the note regarding it being a record of 32 admissions with 5 deaths in the case of a group of no less than 10 hospitals. There is evidently a mistake or the conditions must have been quite abnormal.

Hospital admissions for 1921, according to the report for that year, amounted to 202 with 34 deaths, but the number of hospitals concerned is not stated.

Save at Moshi and certain of the smaller stations (where, however, the diagnosis was in some cases doubtful), it appears that pulmonary tuberculosis is present to an alarming extent. The case mortality of the three towns, Dar-es-Salaam, Taboro and Tanga was 27 per cent., *i.e.* more than 1 in 4 of the admissions die. Notification and treatment in isolation hospitals are strongly recommended.

An educational campaign has been started in Dar-es-Salaam.

(h) *Zanzibar.*

The yearly deaths from tuberculosis are here given from 1907 onwards and it is of interest to note that from 1913 those reported by qualified practitioners are specially designated :

Year	Deaths	
1907	176	
1908	198	
1909	183	
1910	235	
1911	216	
1912	205	
1913	144	(a marked falling-off this year)
1914	5	(amongst in-patients ; no others mentioned)
1915	6	(amongst in-patients ; no others mentioned)
1916	190	(36 of these by qualified practitioners)
1917	41	(registered by qualified practitioners)
1918	188	(44 of these by qualified practitioners)
1919	147	(37 of these by qualified practitioners)
1920	125	(41 of these by qualified practitioners)
1921	48	(registered by qualified practitioners)

From a study of the reports from 1914 onwards, it would appear that the incidence of tuberculosis is greater amongst Indians, Somalis and Arabs than amongst Swahilis. Practically all the cases are pulmonary, surgical tuberculosis being of the utmost rarity. The disease is said to have been introduced by the Indians and its prevalence fostered by their unhygienic conditions and disregard for instructions.

There is a note in the 1921 report that, of 128 specimens of sputum examined at the bacteriological laboratory, 40, or slightly over 31 per cent., showed tubercle bacilli.

Zanzibar City is a congested area and therefore favours the spread of the disease. A town-planning scheme is under consideration. Sanatorium treatment is advocated At present some cases are treated in the native hospital, a most unsuitable place, and the remainder in their homes.

(i) *Kenya.*

The following figures are available from recent reports :

Year	Cases	Deaths	Mortality per cent.
1917	53	15	28.3
1918	63	21	33.3
1919	99	9	9
1920	93	14	15

The evidence available goes to show that the disease is on the increase amongst the native population. It is known to be not uncommon at Lamu and is spreading in the coastal area.

The tendency of Europeans suffering from tuberculosis to come to Nairobi in hope of cure may be a factor in diffusing infection, especially as the conditions there, possibly on account of dust, are distinctly bad.

The 1918 report gives details of the results of *post-mortem* examinations on 328 cases in Nairobi and 151 in Mombasa.

	Nairobi	Mombasa
Acute (lungs)	32	47
Chronic become acute	12	—
Chronic fibroid	2	—
Tabes mesenterica	2	4
Kidney	—	1
Spleen	—	1
Miliary	8	6
	56 = 17%	59 = 39%

If the average, *i.e.*, 28 per cent., represents what is found *post mortem*, what, it is asked, must be the proportion of those living who propagate the disease ?

In the 1920 report it is recorded that, of 500 specimens of sputum examined in the bacteriological laboratory, 89 showed tubercle bacilli. The vast majority of these specimens came from the police depôt, where each recruit has his sputum examined on first arrival prior to commencing training.

(j) *Uganda.*

1. The following table has been compiled from reports available from 1910 :

Year	Cases	Deaths	Mortality per cent.
1910	22	?	?
1911	50	?	?
1912	26	2	7.7
1913	37	3	8.1

It would appear that the disease is very little in evidence and that consequently it has attracted scant attention. At the same time scattered cases of pulmonary affection do occur, while joint and bone tuberculosis is not unknown.

2. Doctor John Howard Cook, who had a very large experience at the Mission Hospital, Namirembe, near Kampala, Uganda, has kindly informed the Committee that, while the disease is not common in Uganda, it exists to a very considerable extent in the itinerant Bahima tribe, or " cowmen ", as they are called. The home of the tribe is in the Ankole district but they are constantly wandering about the Protectorate with their herds of cattle. They live in close proximity to the animals, in a state of dirt and overcrowding such as in itself would undoubtedly predispose to infection. They exist largely upon the milk of the cows and, according to Dr. Cook, they suffer both from pulmonary and joint tuberculosis. It is possible that they become infected from their cattle but there is no evidence of any kind to show that this is the case. Still, in the light of recent French researches on the West Coast, it would undoubtedly be well to have the matter fully investigated. We may state that Dr. Cook has been good enough to communicate with his brother in Uganda and hopes to be able to furnish the Committee with fuller details regarding the distribution of the disease in that country.

(k) *British Somaliland.*

The following table has been compiled from the reports available from 1918

Year	Cases	Deaths	Mortality per cent.
1918.....	113	—	—
1919.....	300	32	10.6
1920.....	263	24	9.04
1921.....	186	21	11.45

There is a note to the effect that the lessened incidence during the last two years may be due to the fact that there has been less poverty amongst the natives.

Pulmonary tuberculosis is said to be very prevalent amongst the Somalis while there is no suitable accommodation for testing cases.

(l) *Anglo-Egyptian Sudan.*

1. BALFOUR noted the prevalence of tuberculosis in Khartoum and Omdurman in 1904. Amongst the civil population of Khartoum there were, in the year ending September 10th, 1910, 58 deaths from tuberculosis and the Medical Officer of Health notes that there were probably many more, as some of the cases of co-called diarrhœa, fever and dysentery were almost certainly tuberculous in nature. The Soudanese are stated to be specially susceptible to the bacillus of tubercle and it is said that obscure febrile cases frequently prove to be general tuberculosis. The presence of the disease is attributed to the exclusion of light and air from the primitive and overcrowded dwellings, to the habit of expectoration and to some extent also to the nature of the dietary. Nearly all the deaths occurred amongst adults — a fact which is in favour of the above view.

Recommendations were made for the establishment of a tuberculosis dispensary and as regards other methods of controlling the disease in Khartoum.

2. According to CUMMINS, primitive Sudanese in natural surroundings show an almost complete absence of the disease and this is borne out by Anderson, who states that amongst the Nyam-Nyams, and Gours of the Bahr-el-Ghazal Province he did not meet with even a single suspicious case. Calmette also says that in the Bahr-el-Ghazal only imported cases can be found. Cummins found no evidence of tuberculosis amongst a large number of cattle coming under his notice in the Bahr-el-Ghazal.

3. The latest paper on the subject is by ARCHIBALD, who thinks that the disease was probably introduced into the Sudan from Egypt in ancient times, but did not spread owing to local conditions (lack of overcrowding, difficulty of communication, etc.). Even at the present time it is practically confined to the larger towns in the Northern Sudan. The Sudanese are very susceptible to respiratory disease and readily fall victims to tuberculosis infection, as noted by Balfour, Bushnell, and Cummins. Comment is made on the difficulty of diagnosing the disease in black troops, even when they are greatly infected. Children do not suffer much. Adult males appear more liable than adult females, but the latter do not seek advice from Medical Officers so the incidence is not trustworthy. Adenitis is the most common form, then lung and pleura infections ; joint affections are uncommon and primary intestinal infection exceedingly rare.

Archibald describes a case of considerable interest both clinically and epidemiologically. It is the first record of mammary tuberculosis reported from the Sudan

and the woman came from a remote part of Khordofan, where she had passed most of her life. The infection was of a chronic type occurring in a country where the acute and progressive forms of the disease have been most commonly observed.

Cummins (1923), in reviewing the paper, states that :

> " The fact that the patient came from Khordofan, a district in which there is a large admixture of Arab blood, and where the Dongola slave merchants had established many trade centres before the days of Gordon, suggests that she may have been exposed in early life to the same conditions of subinfection that are associated with the chronic and ' resisted ' tuberculosis so often met with in European communities. "

The patient had a grown-up daughter in good health and free from any signs of tuberculosis.

IV. Spanish and Italian Colonies.

As regards the Spanish and Italian Colonies, no particulars have yet been obtained.

V. Portuguese Territories.

(a) *Portuguese East Africa.*

No details regarding this part of Africa have yet been received but, in a paper on the occurrence of tubercle amongst East Coast recruits in the Rand mines, Girdwood, Young and others note that East Coast natives from Mozambique show only a small percentage suffering from the disease when examined as recruits for the mines but that during employment they show a terrible liability, being much more susceptible than British South African natives. It is thought that this may be due to the fact that many of them are malarial and hence their resistance is lowered.

In the *Arquivos de Higiene e Patologia exoticas* for 1905 there is a note to the effect that, as far as Mozambique is concerned, cases of tuberculosis are frequent throughout the whole province but occur chiefly in Lourenço Marquez.

(b) *Angola.*

As regards Angola, there is a note in the journal just mentioned to the effect that tuberculosis has a considerable representation in the nosology of the province, claiming numerous victims, especially in the city of Loanda.

VI. Abyssinia.

But little information is forthcoming as regards tuberculosis in Abyssinia. Ziemann reports it as being practically absent from the highlands. Hubers paper *(loc. cit.)* has not been available, but Sharp, in a private communication, states that while primary tuberculosis of the lung is very rare in Adis Abeba (nearly 8000 feet above sea-level) and probably throughout the Abyssinian highlands generally, other forms as, for example, tuberculous glands and joint abcess are frequently seen. He states that tuberculous glands are prominent in the wet season, but tend to disappear during the dry period of the year and that the same change is true as regards tuberculous joints.

No efforts of any kind are made to cope with the disease.

Appendix

(Belgian Congo : Ordinance against human tuberculosis.)

Model I.

BELGIAN CONGO.

District of .....
Station of.....

Medical Report on a case of tuberculosis.

Form of tuberculosis : .....
Method and date of diagnosis : .....
Stage of the malady : .....
Surname and other names of patient : .....
Age, sex, civil status : .....
Birthplace : .....
Profession (? religion) : .....
Present domicile (town, street, number, floor, room) : .....
Former domiciles (in Africa) : .....
Supposed source of contagion (through a relation, by a dwelling, etc.) : .....
Has this patient been warned of the nature of his illness ? .....
Precautions imposed on the patient : .....
....., ..., 192 .

(Signature of doctor, sanitary inspector
or other medical authority).....

Model II.

REGISTER OF TUBERCULOUS PERSONS.

District of .....

Column Headings.

Numbers.
Date.
Surname, other names, description.
Age, sex, civil status.
Domicile.
Cause of contagion.
Form of the disease : Tuberculosis of the respiratory, urogenital or digestive organs : of the bones, joints, glands, skin, etc.
Medical Officer diagnosing the malady.
Manner of leaving the district :
(a) By change of domicile (if authorised).
(b) Repatriated at the expense of the Colony.
(c) Repatriated at his own expense
Death.
Observations.

Model III.

BELGIAN CONGO

Human Tuberculosis.

District of .....

Personal summons to a medical examination from the point of view of tuberculosis.

Name (surnames and other names if possible) .....
Native of .....
Carrying on the profession of .....
Residing at .....
Is required to present himself within a period of.....
From ..... before.....
At (locality and place if possible) .....
To be examined from the point of view of tuberculosis.
If he fail to obey this summons, he will be prosecuted for infringement of the Ordinance of the .....relating to human tuberculosis.
Place and date of despatch of summons.....
Signature of summoning authority.....

Model IV.

BELGIAN CONGO

Human Tuberculosis.

District of .....

Collective summons to a medical examination from the point of view of tuberculosis.

All natives, together with all persons of colour without exception, residing or circulating in *(fill in according to circumstances)* the agglomeration of .... in the chiefdom of..... in the sub-chiefdom of ..... are to present themselves within a period of[1] ..... before..... to be examined from the point of view of tuberculosis.

If any native or any person at present in ..... fail to obey this summons he will be prosecuted for infringement of the Ordinance of ..... relating to human tuberculosis.

Place and date of despatch of summons.....
Signature of summoning authority .....

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[1] Here indicate the hours or days and in the latter case stipulate the dates, for example : " period of three days (that is, from..... to.....). "

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SLEEPING-SICKNESS

Although we employ as a heading the term adopted by the Health Committee of the League of Nations, it will be understood that human trypanosomiasis would be a more comprehensive and therefore better title for the subject now to be discussed.

It is proposed to proceed in the same order and in the same manner as in the case of tuberculosis.

I. French Territories.

Fortunately there is available a recent report by Dr. Gustave Martin which constitutes a concise yet comprehensive review of everything relating to the geographical distribution and prophylaxis of the disease in the French Colonies. This is included in the form in which it was submitted to the Committee and, together with Map D, will give a clear idea of the distribution of the disease and the measures taken for its control.

It will be seen that the Cameroons and French Equatorial Africa with its four colonies of the Gaboon, Middle Congo, Oubangui-Chari and Tchad, are the regions principally affected and that very active and practical measures have been taken to combat the malady, measures which, to a large extent, have been crowned with success. Amongst these, attention may be directed specially to systematic atoxylisation, which was in the first instance a peculiarly French method and which has now been subjected to an extensive trial.

(a) In a brief résumé of the situation as far as French Equatorial Africa is concerned, prepared by Dr. Boyé at the request of Dr. Gouzien and submitted by the latter to the Permanent Committee of the Office international d'Hygiène publique in 1922, the statement is made that in order fully to appreciate the vastness of the task to be accomplished it must be remembered that, not only is the disease very widespread, but that in the regions affected by it the birth-rate is less than the death-rate, a fact to be explained not only by the severity of the infection but because the malady predisposes to sterility and abortion. Confidence, however, in the efficacy of the methods employed is justified by the very distinct lowering of the trypanosomiasis index and on the mortality in all the zones subject to periodic atoxylisation, together with a rise in the birth-rate due in part to pregnant women, submitted to treatment, more frequently reaching full time.

The following is Dr. Martin's report in full :

(b) Geographical Distribution and Prophylaxis of Sleeping-Sickness in the French Colonies.

Report submitted by Dr. Gustave Martin,

Chief Medical Officer of the Second Class attached to Colonial Troops, formerly Head of the French Sleeping-Sickness Mission in French Equatorial Africa.

GEOGRAPHICAL DISTRIBUTION.

The only French colonies in which sleeping-sickness has taken the form of an endemic disease are those of the African continent, and even there it is confined to the equatorial and neighbouring zones ; the north and south of the continent are immune.

In our possessions in WESTERN AFRICA, the disease is confined to certain areas. It may be found in *Senegal*[1], in the " Petite Côte ", in the regions of the Niayes and in Casamance[1]. The native hospital at Dakar receives a patient from time to time from the Joal region. This region has long been known as a focus of the disease, but there has been a marked decrease in the number of cases since the cultivation of the ground-nut has driven back the bush (Dr. RIGOLLETT). Cases of the disease have been reported in all parts of *French Guinea*[2], chiefly in the districts of Boké, Labé, Kindia and of Ditinos in the Goumba region. It has penetrated to the Ivory Coast and to the Hinterland (banks of the Baoulé, districts of Séguéla and Kong). Dr. BOUET[3] discovered a small native focus of the disease in the Bingerville district, but the disease occurs most frequently in the North, in the Bondoukou district. One case has, however, been reported on the coast at Grand Bassam[4]. In *Dahomey* there have only been exceptional and isolated cases in Upper Pendjari in the Kappiri country, whilst *Togoland*[5], which adjoins Dahomey, is infected practically throughout. In Upper Senegal and Niger[6] it is prevalent in the bend of the Niger: the most seriously affected regions are those of Lobi and Mossi, which are watered by the upper reaches of the three Voltas. The disease is found in an endemic form in Koury Ouagadougou, Gaona and Sikasso. This zone is one of the most important permanent centres of sleeping-sickness in French West Africa, thus forming a remarkable exception to the rest of the Soudan. The Sahel country in the west and the Zinder territory in the east appear to be immune.

Sleeping-sickness specifically transmitted by the GLOSSINA PALPALIS is extremely localised in French West Africa, if we compare its sporadic incidence with the very general distribution of the tsetse fly. The disease which develops in one area does not occur in a closely adjacent territory where this tsetse fly is also found. According to ROUBAUD[7], the specific causes which limit the geographical extension arise in consequence of the varying susceptibility of the glossinae to trypanosomiasic infection. This is an example of the biological adaptation of the tsetse fly to the climatic conditions to which it is subjected. The evolution of the trypanosome (*Trypanosoma gambiense*, the causal agent of sleeping-sickness) in the saliva of the glossinae depends on very special conditions. So far from its occurring in all flies, several hundred are often required in order to obtain a single positive case of infection and the number of these cases of infection varies according to the climate of the district where the experiment is made.

Local geographical species of *Glossina palpalis* exist, which are capable to a greater or less extent of transmitting sleeping-sickness. Therefore, although it is unwise to neglect the prophylactic precautions essential in such cases, the dangers of the extension of human trypanosomiasis outside the areas where sleeping-sickness is already in evidence in French West Africa are not very great[8].

In EQUATORIAL AFRICA the progressive advance of the disease is a veritable scourge. It has become more marked during the last few years, especially in Ibenga-Motaba,

[1] THIROUX and D'ANFREVILLE. Géographie de la trypanosomiase. La trypanosomiase au Sénégal. (Baillière, 1911.)
THIROUX, WURTZ and TEPPAZ, S. P. E. 1908 ; May 13th, *Annales de l'Institut Pasteur*, July, 1908.

[2] Gustave MARTIN. Les trypanosomiases en Guinée française. Paris 1906.

[3] BOUET and ROUBAUD. Trypanosomiases et glossines de la Haute-Gambie et de la Casamance, *Bulletin de la Société de Pathologie exotique*, 1912.

[4] BEAUVALLET. *Bulletin de la Société de Pathologie exotique*, June 8th, 1921.

[5] Medizinalberichte über die deutschen Schutzgebiete, 1909-10 ; 1911-12.

[6] GOUZIEN. Répartition topographique de la maladie du sommeil (Ass. Scient. Int. d'Agronomie Coloniale, 1908.
La maladie du sommeil dans le Haut-Sénégal *(Annales d'Hygiène et de Médecine coloniales*, 1908, N° 1).

[7] ROUBAUD. Les mouches tsé-tsé en Afrique occidentale française ; nos connaissances actuelles de leur histoire et leur rôle pathogène. In the *Bulletin du Comité d'Etudes historiques et scientifiques de l'Afrique occidentale française* (published by Lason), 1920.
ROUBAUD. La méthode trophique dans la lutte contre les insectes et les maladies qu'ils transmettent. *Revue générale des Sciences*, May 30th, 1920.

Upper Shari, in Upper Ubangi and M'Bomou. " In the last few years, sleeping-sickness of a very distinct epidemic type has developed in the Chad territory, localised especially on the banks of the Tandjele, the Logone Penndé and the Bahr-Sara, and of a more marked character than in the Congo itself. Wide areas which are almost immune (the plateau of Koumra) (the Goulii country) separate heavily stricken territories (50 %, 90 %) " (Dr. MURAZ).

In the Cameroons, there is an important focus in the basin of the Doumé and of the Upper Nyong.

Below lat. 9° N., which almost passes through Fort-Archambault, sleeping-sickness at present prevails everywhere in French Equatorial Africa ; the degree of infection is obviously not the same in the various districts, but its diffusion may be considered general. Certain districts are becoming depopulated, the inhabitants disappear, and the resultant effect upon labour, which is so necessary for the development of the country, makes itself painfully felt. " The ravages of trypanosomiasis are assuming a permanent character. They increase in one direction and decrease in another like the surging of a ceaseless swell[1]. "

The disease in these districts often spreads in a manner unknown in French West Africa. It advances by spurts. The disease, breaking out under one roof, strikes down all the members of one family, destroys whole villages, and devastates a whole territory. Our first observations made in 1907 with our lamented colleague LEBŒUF and our friend ROUBAUD on hut epidemics[2] and the part played, by mosquitos,[3] whose repeated stings sow the germs of the disease everywhere in the neighbourhood of a case of sleeping-sickness, have been confirmed. Flagellate parasites are far from being rare in the peripheral circulation[4]. *They are very often found in the blood, in countries where the disease is epidemic.* " If the frequency and number of trypanosomes in the blood are characteristic of the epidemic, they also explain it to a certain extent ; the chances of the multiplication of these cases are increased, since the infection of the disseminating insects is greatly facilitated[5]."

Direct contact of virulent blood with a more or less healthy skin, presenting very slight abrasions, suffices to enable the *Trypanosoma gambiense* to penetrate into the organism. This method of contagion should be taken into account in the Congo, where, in numerous villages, all the inhabitants are tatooed and practise scarification upon each other with knives[6].

" There is no doubt, " writes Dr. OUZILLEAU,[7] " that sleeping sickness is a *family disease* favoured by cohabitation. " Not only do numerous tribes live herded together in huts in deplorable promiscuity, but these huts themselves are grouped at a short distance from one another, forming very crowded villages, with little intervening space. Suffering real privations, even neglecting his food, the native, ignorant of even the rudi-

[1] Dr. CLAPIER. Enquête démographique et état actuel de la trypanosomiase au pays Bangala. *Bulletin de la Société de Pathologie exotique*, December 8th, 1920.

[2] Gustave MARTIN, LEBŒUF and ROUBAUD. *Bulletin de la Société de Pathologie exotique*, 1908. Epidémies de maladies du sommeil au Congo français. La contagion par familles et par cases (p. 144). Expériences de transmission par les moustiques du genre *mansonia* (p. 355).

[3] La maladie du sommeil au Congo français. Report by the Mission of Enquiry, MARTIN, LEBŒUF and ROUBAUD. Published by Masson, 1909. Chapters : Manner of dissemination of the disease. Epidemics, pp. 243-253. Gustave MARTIN and LEBŒUF in the *Traité Pathologie exotique*, Grall-Clarac, p. 329.

[4] Gustave MARTIN and LEBŒUF. Trypanosomiase africaine, in the *Traité Pathologie exotique*, Grall-Clarac, 1912, published by Baillière, pp. 330-366.

[5] Dr. CLAPIER, *Bulletin de la Société Pathologie exotique*, July 13th, 1921. Dr. CLAPIER at Bandja, found the parasite in the blood upon direct examination in 55 % of the cases. His discoveries may be compared with those of HECKENROTH, who found trypanosoma in 32 % and even 55 % of the cases in the Sangha ; and with those of LEBŒUF, in Oubanghi and the Congo, where he obtained a result of 37 %.

[6] Gustave MARTIN and RINGENBACH. Pénétration du trypanosome à travers les téguments et les muqueuses intactes. (*Bulletin de la Société Pathologie exotique*, July, 1910.)

[7] *Bulletin de la Société Pathologie exotique*, March 1915, p. 11

mentary principles of hygiene, offers no resistance to an affection which develops rapidly among poor, resourceless communities[1]."

Lack of physical stamina is one of the principal causes of the heavy mortality which is prevalent in the Congo in consequence of trypanosomiasis. If the glossina remains the chief disseminator of sleeping-sickness in the Congo, if its presence is absolutely necessary for the maintenance of the endemic character of the disease, mosquitoes and perhaps other stinging insects are important auxiliaries and play a formidable rôle as epidemic agents.

It would of course be inaccurate to hold sleeping-sickness exclusively responsible for the depopulation and mortality in countries where nutrition is often inadequate and always defective, and where the bad living conditions, diseases of the lungs, syphilis, malaria, intestinal parasitism, physical debility and lack of stamina are the causes of a terrible morbidity, but trypanosomiasis is the first and most important of the endemic diseases to be contended with. It will be useful to show in some detail how it is spread over our equatorial colonies.

In the *Cameroons*, sleeping-sickness[2] exists at and near Douala and in the Wuri basin, but it is particularly severe in the Maka region, both north and south, in the Doumé district, in the area rendered marshy by the water-courses flowing towards the Nyong and in the basins of the Doumé and the Nyong and of the Upper Dscha and the Woumo.

Statistics obtained in 1920 in the territory of the *Upper Nyong* sector show a large proportion of cases of trypanosomiasis, exceeding 30% in certain villages. On the periphery of the sector, on the contrary, the situation is much more reassuring[3]. The regions most seriously affected are Akoloninga 14%, Essi 18%, Guili-Oundi 13%, Guili-Mendouka 14%, Butoua 25%, Betougou 27%, Sidiam 51%, Membi-Bégalon 32%. (Dr. Huot)[4].

In the south-east, a few cases have in the past been recorded at Moloundou and at the Rapids (Sembé-Koundou).

In the plain of M'Bo (M'Bans basin) suspect cases were observed in 1906. A woman suffering from trypanosomiasis who was a native of this region died at Dschang in 1912, and in the course of the same year 25 patients were treated.

In the south of the Ebolova district near the Gabon frontier, cases were notified in 1911 in the Aïna basin.

In *Gabon*, the *coastal area of Libreville*, between Santa-Clara Point and Cape Esterias, is chiefly peopled with Boulous and Bengas, who live in fairly well-constructed villages close to the seashore, swept by breezes from the main. They live on fresh fish, which they catch in abundance and barter for manioc and bananas. These populations seem to have greater powers of resistance and to be more prolific than the races of the interior. Morbidity due to trypanosomiasis is low (men 0.43%, women 1.34%, children 0.46%).

The endemic index is 0.78% in the *Cocobeach* " subdivision ". (Dr. Sicé, 1921.)

In the *Como Basin*, the Pahouins, who live in huts lost amid mangroves and mud, pay heavy tribute to malaria and syphilis. Infantile mortality is considerable. Morbidity due to sleeping-sickness seems fairly low (2.08 % for men ; 2.05% for women ; and 1.37 % for children).

Of all the territories of the *Gabon-Como estuary*, the Chinchona and Kango " subdivisions " show the highest endemic index-number (4.07 and 3.07%). A line of stages

[1] See Roubaud. Le bien-être dans le paludisme et les maladies trypanosomes, *Bulletin de la Société de Pathologie exotique*, No. 10, 1921, p. 663.

[2] Gustave Martin. L'existence au Cameroun (published by Larou, 1921). Répartition de la maladie du sommeil, pp. 164-170 and 215.

[3] Lepine. Maladie du sommeil au Cameroun. *Annales de médecine et de pharmacie coloniales*, No. 2, 1921.

[4] Jojot. Maladie du sommeil au Cameroun. *Annales de médecine et de pharmacie coloniales*, No. 4, 1921.

connects these districts with Lambaréné and N'Djolé. The aborigines state that sleeping-sickness was introduced by people from the Ogoué region.

Though *Lower Ogoué* is at present fairly immune (Les Eschisas 0.6%, Lambaréné 2.2%.), *Upper Ogoué* appears to be very seriously affected. The Awandjis tribes on the Lékery show 15% of cases of trypanosomiasis, the Bandjabis and the Batitas 35% and the Batchanguis in Upper Liboumbé 50 % (Dr. GUILLET) and even 60% (Dr. AMBIEL). According to the natives, the disease first made its appearance four or five years ago. The administrative reports scarcely mention it before 1917. The invasion of these regions by trypanosomiasis has had disastrous consequences. Salak, which formerly had an administrative post and a factory, is to-day a desert. " Although the situation at first appears grave, we may be confident as regards the future. The races occupying Upper Ogoué are still fairly robust and many are well fed. Perhaps, indeed, these circumstances have prevented their being further decimated by epidemic diseases. Moreover, these races have never drunk trade spirit. A campaign could therefore be undertaken on favourable conditions. Syphilis and sleeping-sickness are the two enemies which should be attacked without delay. " (Dr. GUILLET.)

From *Loango to Ludima* the disease is rare in the coastal area. Farther inland, in Mayombe, the number of cases increases, especially in the low-lying regions where the course of the rivers is slow and where there is a dense undergrowth, in which the glossinae can live and breed. At altitudes of 400 to 500 metres, cases are exceptional (Dr. CAVAUD). The Bavili tribe shows a percentage of 1.55 at Madingo and 3.53 at Loango ; the Balombo tribe (Mayombe) 9.10 and the Bayaka tribe (N'Tima " subdivision ") 14.91.

The index-number for the *Niari Valley*, which the Brazzaville-Ocean railway track is to follow, is comparatively high (22.7% to 25% at *Loudima*). Advancing from *Mindouli* (5%) towards the Djoué, the proportion of cases of sleeping-sickness decreases. In the *Pool district* (Kirkala-Boko) the index-number is only 2 %.

Around *Brazzaville*, the endemicity (1 to 2 %) is maintained by people coming from infected areas : fishermen, the crews of river boats, hunters, nomads coming from Oubanghi and Sangha.

The right bank of the Congo from Brazzaville to the Léfini is the worst region of the Lower Congo. Of the aboriginal inhabitants of the free villages there remain, so to speak, no traces at all. The only groups of any consequence are formed by the " postes à bois " (timber posts) where representatives of all the races of French Equatorial Africa live, recruited by European merchants for work which they often abandon after a few weeks. The general percentage of cases is from 18.2 % (1919 and 1920) to 23.2 % (1921) In the basin of the *Likouala-aux-herbes*, the disease is less prevalent in the Babolé country (2 %) where the tsetse and mosquito are rare, and the region is characterised by immense prairies of tall grass which are flooded half the year. In the wooded area beyond, where the glossinae are more numerous, there is an average infection of 6 %. The intensity increases in Upper Likouala : 15 % in the villages forming the central district of Epéisa and 19.50 % among the Eléké tribe (33 % among men, 20 % among women and 13 % among children).

On *the banks of the Sangha*[1], trypanosomiasis was formerly prevalent to a serious extent in the Bania-Carnot district, at Carnot itself and among the groups around that station. At the present time, disease is still almost confined to those parts. At a distance exceeding a day's journey to the north, north-west, or east of this centre, recorded cases become rare. In the very places where the disease was most virulent in times past, cases seem at present to be isolated and to some extent sporadic[2].

[1] OUZILLEAU. La maladie du sommeil dans la Haute Sangha. *Annales d'Hygiène et de médecine coloniales* No. 2, 1911. *Bulletin de la Société de Pathologie exotique* (March 1911).

[2] PHIPPS. *Bulletin de la Société de Pathologie exotique*, July 9th, 1919

From the Sangha Basin to the Ubanghi Basin in the para-equatorial zone, lat. 2° North, where endemicity might have been assumed to be fairly uniform, the intensity of the disease increases from west to east in proportion to the increase of administrative and commercial activity (Enyilé 11 % in 1920, as compared with 8 % in 1914). The writings of Dr. CLAPIER[1] showed that the percentages of epidemicity were definitely higher than those published in 1914 by Dr. OUZILLEAU. At the present moment, however, trypanosomiasis is on the decrease in Upper Motaba (5.8 %) and in Upper Ibenga (4.9 %).

The riparian villages of Middle Ubanghi show a high index-number. Though it is only 10 % at Bétou it rises to 23 % both in the south from Boyéli to Imessi, and in the north as far as Mogumba. Beyond Bétou the Banda tribe was estimated by Dr. CLAPIER to furnish 19 % of cases as compared with 6 % in 1909 (Dr. HECKENROTH). In 1914 Dr. OUZILLEAU[2] obtained the following averages : 15.3 % from Lukolita to the Balloys, 18.8 % from Impfondo to Dongu ; 9 % from Dongu to Bitu ; and 19.7 % from Bitu to Mogumba. Mogumba and Dikoto both furnished 56.6 %.

In August and September 1919, Dr. CLAPIER visited the M'Baka country from the Labai to Bangui. Trypanosomiasis is still seriously prevalent along the watercourses. The average index for the riparian villages is 8.7 %, that of the villages in the interior is only 3.1 %. On the bank of the Ubangi the scourge has abated to a marked extent since 1912. The Bimbo, Yakloi, Bokassi groups showed 39 %, 25 %, 31.4 %, 24.7 %, to Dr. HECKENROTH in 1912. They only yielded 5.3 %, 6.3 %, 12.2 %, 9.2 %, to Dr. CLAPIER in 1919.

In the Lobai basin from Loko to the Ubanghi, the present average number of cases is 6.8 %. On the left bank of the Lobai, the Baiki territory, the villages of which are situated on wooded hills, where no glossinae are found, may be considered as immune (0.6 %).

In the villages lying at a greater distance from the Ubanghi, Bagandu and Bakota, only 1.5 % cases have been observed. Bagandu is situated on a vast plateau 4 kilometres above the river level. The natives probably become infected outside the village at Zomia, which lies in an unhealthy hollow near the Lobai beside a barrage of islets where the tsetse fly is numerous and conditions are bad (index 18 %).

In Upper Ubanghi the banks of the great river have long been notified as highly infected. In June 1919 Dr. CLAPIER discovered a genuine focus of sleeping-sickness between Bangui and Uadda, in villages which were particularly ill-kept and ill-constructed, choked by the undergrowth of forests (Djongoye 36 %, Gniako and Bakundun 17 %). Dr. OUZILLEAU, who visited the regions of Nsakara, Yakoma and Zandé in 1912-1913, has published most interesting and instructive works[4] on the spread of disease in the Mobaye, Bangassu and Zeinio territories. Among the Yakomas, whose villages lie at intervals along the banks of the Ubanghi and the M'Bomu, he found the proportion of cases between the Kotto and the M'Barri amounted to 40 %. In the Bangassu district alone, he discovered a number of cases totalling 6,225. The Zandé country, which still has an active focus which practically merges in that of Zeinio, showed a rather lower percentage, which nevertheless amounted to 20 %.

In Upper M'Bomu, where the villages lie very far apart, it is difficult to collect the inhabitants. The proportion of cases varies from 10 % to 17 % (Dr. GILLY). It is as small as 6 % in the extreme eastern portion bordering on the Anglo-Egyptian Soudan.

[1] CLAPIER. Etat actuel de la trypanosomiase au Moyen-Congo. *Bulletin de la Société de Pathologie exotique*, July 13th, 1921 ; and *Bulletin de la Société de Pathologie exotique*, December 1920.

[2] OUZILLEAU. Enquête sur les trypanosomiases au Moyen-Oubanghi. *Bulletin de la Société de Pathologie exotique*, December 1920.

[3] CLAPIER. La trypanosomiase dans l'Oubanghi. *Annuaire Médical. Bulletin de la Société de Pathologie exotique.*

[4] OUZILLEAU. Rapport sur la maladie du sommeil dans le Bas M'Bomou ; 1912-1913. *Bulletin de la Société de Pathologie exotique*, March 10th and April 15th, 1915.

On the banks of the M'Boku it is from 15 to 17 %, in the Zeinio district 15 % and in the Kaba territory from 10 to 12 %.

Leaving the banks of the Ubanghi and turning northwards and in the direction of the Chad, there are four heavily stricken territories in Upper Sharri ; that of Marali (index JAMOT 26 %, index BOGES DE CHOISY 25.2 %), of Fort Grampel (11.4 %), of Bambari (7.3 %), of Buka (7.3 %). The index is low at Dekoa (3.2 %), at Grimari (0.9 %), at Fort Sibut (0.6 %) and in the M'Bris (0.3 %).

In the districts of the middle Shari and the middle Logona, Dr. BOUILLEZ had already met with numerous cases of sleeping-sickness in 1914-1915 and again in 1919, but since that time the disease has appeared at points where it was completely unknown. At the present moment it is assuming epidemic proportion in these territories. Three-quarters of the Mayo-Kebbi district are immune, but the eastern portion of the Kilo subdivision has been severely visited. There, on the banks of the Tandjele, a tributary of the Logona, lie the villages where investigations carried out in February revealed percentages of 54.58 % for Schoa, 19.95 for Fa, 12.01 for Chakacere.

The Middle Logona district is watered by two important rivers, the eastern Logona (or Penndé) and the western Logona. Their junction forms the Logona proper, which flows into the Shari at Fort-Lamy. In the Penndé-Logona territory which from the south to the north-west extends from Goré to Laï, through Doba, the endemo-epidemic flux has increased markedly between 1919 and 1921. The index has risen from 10.13 % to 16.42 % at Gore, from 12.78 % to 25.56 % at Bakaba, from 16.21 % to 20.94 % at Doba, etc. *It has reached* 64.51 % *at Bemoa,* 90 % *at Pullu,* 63 % *at Biokolo.* It is only 3.68 % at Laï. *The entire country between Laï and Gore is being ravaged by trypanosomiasis of an extremely severe epidemic nature.*

In the basin of the Bahr-Sara, the principal tributary of the Shari, the index varies from 10 % to 35 %, 41 % and 43 %. The territory lying between the Bahr-Sara and the Shari is comparatively free, except for the villages scattered along the lower reaches of the Bahr-Ko.

On the Shari itself, the villages of Mayabundu and Mussafoye, with very low indices, mark the stages of the endemic disease towards the junction of the Bahr-Sara and the Shari.

The lower part of the course of the Nana-Baria is suffering severely (20 to 24 %), but the index is only 5.08 % at Fort Brussaux.

To the east of the course of the Shari, trypanosomiasis is rare in the Sara-Kaba country in the former subdivision of Kyabe, though the lower reaches of the Bahr-Salamat show a few cases. The cases notified seem to have been introduced from elsewhere. The Salamat country is immune (LE COZ, 1922), also the N' Dele (Darkuti territory). No case was discovered by Dr. MURAZ at Ain-Timouiane on the occasion of his visit to that station in 1913.

The endemic zone of human trypanosomiasis in the CHAD in 1916, according to Dr. BOUILLEZ *(Bulletin de la Société de Pathologie exotique* N°. 3) included only the southern hinterland Penndé-Bahr-Sara, with a long narrow strip stretching from south to north and reaching as far as the junction of the Bahr-Sara and the Shari. In the west, stretches of immune country lie between Gore and the course of the Tandjele, where the Shoa focus had already been notified. In 1922, the northern boundary-line lay almost entirely between lat. 9° and 10° N. forming two long strips of territory of which the rivers Shari and Logona were the axes. The most northerly points lie on the Logona at about 40 km. to the northwest of Laï, and on the Shari about 100 km. to the north-west of Fort Archambault. The spread of sleeping-sickness to the north of this line need not be feared, if prophylactic measures are continued in the territories lying to the south of this line and if the work of the posts established at Fort Archambault, Laï and Leri is not

interrupted. The geographical conditions themselves would seem to oppose any extension. The forest belt, a favourite habitat of the *Glossina Palpalis*, ends at about lat. 1° N.[1].

Prophylaxis

The organisation of remedial measures to combat the spread of sleeping-sickness in West Africa, the Cameroons, and Equatorial Africa, must depend upon the incidence of the disease.

In French West Africa, human trypanosomiasis is localised, and is not common except in territories of comparatively small extent.

The development of the medical services for the relief of the natives renders the working of numerous health organisations possible and cases are as a rule easily discovered and kept under observation. Each patient is treated at the dispensary nearest to his home, and measures for the destruction of the breeding-grounds of the tsetse are taken according to circumstances. Clearing the ground, partial deforestation, the clearing of gallery forests, are amongst the most efficacious: " It is owing to the natural denudation of the greater part of their course that the Senegal and the Niger are not infested with glossinae throughout the whole length of their banks ". Although such a task is an arduous one, there are also examples of *artificial clearings* carried out by the natives for the purpose of getting rid of the fly. Thus, according to L. Marc, the banks of the Black Volta have been completely cleared over the whole territory occupied by the Dagari and the Lobi. This method might well be applied more generally[2].

Although the campaign against tsetse flies must needs be a heavy task, in the dense areas of the forest or the wooded belts which cover the greater part of the coast in Guinea, the Ivory Coast, Togoland and Dahomey, much could assuredly be done in the most northerly regions of the areas infested by these flies in the Soudan and Senegal. The very small district of Nianing, for example, on the Petite Côte of Senegal, which is a well-known focus of sleeping-sickness, might undoubtedly be cleared of infection without any serious difficulty

In each of the colonies of the group in Senegal, Guinea, etc., a special service might well be organised to carry out a medical exploration of the country and to make investigations concerning the endemicity, virulence and possible extermination of the disease.

To prevent natives coming from the Congo or the Cameroons who are infected with trypanosomiasis from spreading the disease in our other African possessions on the western coast, various regulations regarding medical examination and health passports are in force. The earliest was that issued by Governor-General Ponty *(Official Journal of Upper Senegal-Niger, September 1st,* 1911[3].

In the Cameroons, where the district in which the disease is prevalent is well known and is comparatively clearly defined, the Health Service has devoted its attentions chiefly to a prophylactic campaign in the Upper Nyong sector.

In French Equatorial Africa, where there are few completely immune areas, except the Chad, it was necessary to draw up a general and methodical plan of action, to be carried out practically throughout the territory in order to combat the disease. Rigorous

[1] Muraz. Essai de détermination de la limite Nord de la maladie du sommeil en Afrique équatoriale française. Travaux du secteur de la prophylaxie du Tchad, d'avril 1920 à avril 1921. *Bulletin de la Société de Pathologie exotique*, 1922. No. 4.

[2] Le pays Mossi. Paris, 1900.
Roubaud. Les mouches tsé-tsé en Afrique occidentale française. *Bulletin du Comité d'études scientifiques et historiques de l'Afrique occidentale française.*

[3] *Bulletin de la Société de Pathologie exotique*, No. 8 (October 1911), p. 507.

preventive measures had to be adopted to avoid the grave development of the disease which directly threatened the North. We shall consider them in the following order :

1. *The general organisation of the prophylactic service and therapeutic prophylaxis* (atoxylisation) ;
2. *Laboratories* ;
3 *The various prophylactic areas* ;
4. *Sanitary cordons and posts for the supervision of traffic* ;
5. *Stations for the treatment of the disease and isolation villages* ;
6. *Agronomic prophylaxis* (destruction of the tsetse by clearing the woods) *and administrative prophylaxis* (removal of villages).

General organisation of the prophylactic service and therapeutic prophylaxis.

As regards French Equatorial Africa, following upon the work of Brumpt[1] and that of the French Congo Mission consisting of Gustave Martin, Leboeuf and Roubaud (1906-1908), which was carried out under the auspices of those high scientific authorities MM. Laveran and Bouvier and our friend and master Professor Mesnil[2] of the Pasteur Institute, the Committee of the Société de Pathologie exotique, appointed on June 10th, 1908, laid down, in a report by MM. Laveran and Mesnil, the principles of prophylaxis against sleeping-sickness in the human organism. Since that time the great importance attached to this question by high public authorities has been reflected in numerous orders issued by the successive Governors-General of French Equatorial Africa, MM. Merlin, Angoulvant and Augagneur. It need only be mentioned here that the first order for the supervision of sleeping-sickness in those centres in the Congo territory in which a regular medical service existed, dates from June 23rd, 1909 (*Bulletin de la Société de Pathologie exotique*, October 10th, Nos. 8 and 9) and that the first official circulars issued by Governor-General Merlin regarding the clearing of undergrowth, the removal of villages, and school hygiene appeared in the Official Journal of the colony on June 15th, 1909. On February 7th, 1911, sleeping-sickness was included in the colonial list of notifiable diseases.

In 1908 and 1909, Dr. Ouzilleau was in charge of a treatment camp in the Upper Sangha, and at this period the Uesso medical station was issuing *medical passports*. The isolation settlement at Brazzaville was constructed at the beginning of 1910.

As early as 1912, Mesnil and Roubaud[3] arrived at the conclusion that the most effective prophylactic measure was the sterilisation, for varying lengths of time, of the peripheral blood of persons infected with sleeping-sickness. Aubert and Heckenroth[4], who had practised this form of chemical prophylaxis on a large scale in the Upper Sangha, were of opinion that in a short time it would yield decisive results, and would considerably reduce the incidence of sleeping-sickness. They proposed that medical tours of inspection should be held periodically with a view to the systematic examination of all natives, and to the prophylactic treatment of all sleeping-sickness patients.

[1] Brumpt. Distribution, étiologie et prophylaxie de la maladie du sommeil. *Arch. de Parasitologie.* January 9th, 1905.
[2] See Laveran and Mesnil. Trypanosomes et trypanosomiases. — Mesnil. Rapport sur les premiers travaux de la mission française. February 1908. *(Association internationale d'agronomie coloniale.)*
[3] Mesnil and Roubaud, « Sur la prophylaxie des trypanosomiases ». *15th International Health Congress, Washington,* September 1912.
[4] Aubert. *Annales d'Hygiène et de Médecine coloniales,* 1911. — Heckenroth. *Bulletin de la Société de Pathologie exotique,* 1912, No. 6, page 401.

In 1912 and 1913, Dr. OUZILLEAU examined 20,000 persons in Lower M'Bomu, and treated about 7,000 patients. He expressed his satisfaction with atoxyl prophylaxis, and was strongly of opinion that this treatment might be extended to all patients in French Equatorial Africa, if a medical organisation were set up, consisting of about twenty doctors, who should be exclusively employed in this work. He was in favour of the system of tours of inspection, as being the only method by which the whole population could be inspected and all sleeping-sickness cases, without distinction, could receive treatment. *(Bulletin de la Société de Pathologie exotique*, April 14th, 1915, page 31.)

At the end of 1916 the Public Health Council of French Equatorial Africa laid the foundation of the organisation of prophylaxis areas. In December 1917, at the suggestion of Governor-General ANGOULVANT, a Committee met at the Colonial Ministry in Paris (on December 5th and 15th), Inspector-General GOUZIEN presiding, and decided upon the programme of work, the general lines of which were at once embodied in instructions which were communicated to the colonies concerned. There was already in existence a local Order, dated April 12th, 1917, which provided for the issue of medical passports, gave instructions concerning the clearing of undergrowth and laid down the conditions of the courses to be held at the Pasteur Institute at Brazzaville for medical officers and assistants about to serve in prophylaxis areas. Major JAMOT, of the Army Medical Corps, was sent to the Upper Chari to organise the first area, which he was in charge of from July 1917 to October 1919. In view of the satisfactory results obtained, a second area was established in Ibenga-Motaba on January 8th, 1919, and a third in the Chad district on May 30th, 1919.

On July 7th, 1920, the " Société de Pathologie exotique " appointed a committee, with M. LAVERAN as Chairman, which codified and amplified the various prophylactic measures to be taken in French Equatorial Africa and the Cameroons in relation to the general organisation (areas), therapeutic prophylaxis (atoxylisation), prophylaxis by mechanical means and in connection with agriculture (deforestation), and prophylaxis by administrative methods (traffic supervision, medical passports).

On January 22nd, 1921, Governor-General AUGAGNEUR issued two local orders dealing with the recruitment and remuneration of the staff and the working of the prophylactic service in the areas.

The first measure to be taken to check the ravages of sleeping-sickness concerns the patients, who constitute, as it were, a reservoir of virus. The object of therapeutic prophylaxis is to destroy the trypanosome in the infected organism, and thus to reduce, to the greatest possible extent in the shortest time, the existing accumulation of virus. Owing to the ease with which it can be used, its comparative cheapness and its destructive action on the trypanosome, atoxyl is an excellent agent. Many specialists have been instructed to carry out regular atoxyl treatment in the course of systematic tours of inspection, in order to destroy the trypanosomes in the blood of all infected persons. Excellent results have already been obtained in those infested areas in which the staff is adequate to the work of registering and treating all the patients. Atoxyl is used in different ways according to circumstances. In districts which are sparsely populated or difficult of access, the method employed consists in injecting into every adult patient two massive doses of 1 gr. of atoxyl (0.05 per kg. of the patient's weight) at an interval of eight days. The first injection is ordinarily carried out by a doctor, and the second by a detachment of subordinate officials who follow him. The treatment is repeated on each tour of inspection every four or six months, or, if possible, every two months. This is what may be called a *minimum of prophylaxis*, applied to the community. The object should be gradually to obtain *cures* by giving, at treatment centres, dispensaries and isolation settlements, a fixed and regular treatment, aiming at the complete cure of all curable cases.

We are in agreement with Drs. OUZILLEAU, BRODEN and RODHAIN in their view that during the early stage (when trypanosomes are only to be found in the blood and the lymph) patients should be treated with massive doses of atoxyl (attacking treatment), in order to sterilise the organism without delay. This principle is the essential basis of Ehrlich's chemotherapy, but it is important that it should only be applied to patients whose cerebro-spinal fluid is normal. Patients in the second stage (where the cerebro-spinal fluid contains trypanosomes, or where there is hyperleucocytosis and hyperalbuminosis of that fluid) should not be treated with very strong doses of tripanocidal substances.

As therapeutic agents Dr. OUZILLEAU advocates atoxyl (in a 1/10th solution) and tartar emetic (in a 1/100th solution) injected intravenously. He advises six injections of atoxyl (about 0.02 grs. per kg., *i.e.* 1.10 grs. for a patient weighing 60 kgs., or 1.20 grs. for a patient weighing 70 kgs.), alternating weekly with five injections of tartar emetic (0.06 grs. for a patient weighing 40 kgs., 0.10 grs. for a patient weighing 60 kgs.). The cure requires eleven weeks. Persons who cannot be placed under observation should be given a series of injections every six months.

Dr. OUZILLEAU points out that, in determining the strength of the doses of atoxyl which should be administered, weight is not the only consideration, since in patients who have an excess of fatty matter the weight is not necessarily proportionate to the functional capacity of the organs. A thin youth whose constructive and eliminatory processes are unimpaired will be able to stand larger doses than an obese patient whose functions are retarded.

Dr. JAMOT advocates a combination of neo-arsenobenzol with injections of atoxyl, *i.e.* for an adult, two doses of 0.60 of neo-arsenobenzol with four doses of 0.60 of atoxyl between them, an interval of one week being allowed between the injections.

The Order of January 22nd, 1921[1], issued by Governor-General AUGAGNEUR of French Equatorial Africa, provides for the organisation of prophylaxis areas covering those districts in which the campaign against sleeping-sickness and the treatment of infected persons are most essential.

Each area has a special medical staff taking its orders direct from the Governor-General and the Director of Public Health. The chief medical officer of the area is aided by European and native assistants, all of whom have undergone a special course of instructions before entering upon their duties. The centre of the area is fixed at a place other than the residence of the medical officer in charge of the medical post, who has also the duty, within his own sphere of action, of treating sleeping-sickness patients on the same footing as all other patients.

The chief medical officers of areas lead a nomadic life. It is their duty to visit, at least once in every half-year, all the villages and fixed or temporary settlements in their area. Before visiting a settlement they obtain from the Chief of the subdivision a copy of the capitation tax return. A registration card (*medical card*), for which provision was made in the *Order of April 12th*, 1917, is drawn up in duplicate, one copy being issued to the patient. It is essential that this card should be protected by a tin case.

The duty of area medical officers is to discover sleeping-sickness cases and to treat them with atoxyl[2], to study the conditions of infection, to discover the breeding grounds of the tsetse fly and to suggest measures by which the spread of the disease may be arrested (removal of villages, isolation of cases, partial deforestation, *i.e.* the admission

[1] *Annales de Médecine et de Pharmacie coloniales*, 1921, No. 1, p. 125.

[2] We need not here go into details as to the method of collecting the people, the procedure to be employed and the investigation of cases. Highly interesting particulars on all these points will be found in the memoranda by Dr. Ouzilleau ; Rapport d'ensemble sur la maladie du sommeil dans le Bas-M'Bomou (1912-1913). *Bulletin de la Société de Pathologie exotique*, April 14th, 1915., Nos. 3 and 4 ; in the memorandum by Dr. Jamot, *Bulletin de la Société de Pathologie exotique*, 1920, No. 5, and his article on the methods of making use of the natives, *Annales de Médecine et de Pharmacie coloniales*, 1921, No. 1 ; and in the memorandum by Dr. Muraz in the *Bulletin de la Société de Pathologie exotique*, April 12th, 1922, No. 4.

of light to the gallery forests). Light and air must be allowed to enter the forest where it borders upon streams, and clearings must be made (ROUBAUD). The tsetse fly avoids open spaces in which it can neither conceal itself nor breed. In order to reproduce itself, it needs damp ground covered with undergrowth[1].

The doctors inform the Chief of each subdivision by letter (a copy of which is communicated to the Public Health Department) of the new work which is required, and the action which has been taken to give effect to their instructions.

Undoubtedly there is no work, civil or military, in any colony, which involves such great fatigue and such an abnormal way of living as the work of an area medical officer. His life is one of constant travel, broken only by occasional periods of rest at a station ; moreover, he is permanently isolated among the natives, — a form of isolation which, by general consent, is the most difficult of all to endure.

The area medical officers have a very difficult task, for they have never a resting-place for any appreciable period ; they are always camped in village huts or under canvas ; they lack the relative comfort and good food which sedentary life at a station would afford ; and they are always alone in the midst of their detachments [2].

Each prophylaxis area is equal in size to from four to six French departments. These areas extend over vast tracts of country, often marshy, often covered with dense forests, which are only broken by occasional small clearings containing tiny villages, — groups of huts with bark walls and palm-leaf roofs. Where the trees stop or open out, we find savannahs of grass two or three yards high. The heat is suffocating. Both in the forest and in the savannah the only ways of communication are narrow footpaths, overgrown with vegetation and winding round the smallest obstacles. There are no bridges across the rivers and the paths are continually disappearing into the marshes. In many cases the only means of travel is in unsafe canoes, up winding streams broken by rapids and infested with tsetse flies along their banks. Such are the conditions under which the doctor has to travel, in order to track down to its most secret haunts the disease which is decimating whole tribes, and which, but for his intervention, would ultimately exterminate them [3].

If every medical officer can completely cover his area twice over in a year, that is as much as can be expected. These officers should be provided with rapid means of transport, which would enable them to increase the number and speed of their tours. In the Gabon and in a portion of the Middle Congo the nature of the ground and the tropical character of the vegetation will long remain an obstacle to the establishment of such means of communication. Ubanghi-Chari is more favoured in this respect. From Bangui to Fort Sibut and Fort Crampel there is a broad carriage road 340 kilometres long, off which there are a number of branch roads accessible to light cars. The system consists at present of 1200 kilometres of road fit for use. Its great value in the medical campaign against sleeping-sickness is obvious. In a few days of rapid motor travel the doctor can cover as much ground as he could formerly have done in months of hard marching. In regions where there is not even on an average one doctor for 150,000 people, spread over 50,000 square kilometres, the remedy must be brought to the patient's door. No prophylactic work can be done, and no medical assistance can be given without roads. A good road system may compensate for the inadequate numbers of the medical staff[4].

[1] ROUBAUD, in : Gustave MARTIN, LEBŒUF and ROUBAUD : La maladie du sommeil au Congo, 1907. *Glossina palpalis* : son rôle étiologique ; and *Comptes-rendus hebdomadaires des séances de l'Académie des Sciences*, February 24th, 1908, March 2nd, 1908, *Bulletin de la Société de Pathologie exotique*, 1908.

[2] See the reports of Chief Medical Officer BOYÉ.

[3] M. DELAFOSSE. La lutte contre la maladie du sommeil en Afrique équatoriale française ; sa nécessité, ses difficultés. *Dépêche Coloniale*, of June 22nd, 1922.

[4] M. DELAFOSSE : L'hygiène au centre africain : la route c'est la vie ; le cantonnier est un merveilleux auxiliaire du médecin. See *Dépêche Coloniale*, June 27th, 1922.

In the depths of the tropical regions, in new countries where he has to reckon with the mystical mental attitude of the aborigines, and of certain tribes which are still restive and discontented, the doctor is not always received with open arms. The belief held by the natives that they are untouched by the disease when they have only just become infected, their fear of becoming known and being registered, their cowardice, their habitual inertia, which is sometimes aggravated by obvious ill-will, — all these circumstances tend to make such treatment as the injection of atoxyl difficult and frequently ill-received. In view of the importance of making as complete an inspection as possible of every village, the assistance and concurrence of the administration must be secured, for otherwise there is no hope of success. The co-operation of the heads of subdivisions or districts is essential if the prophylactic tours are to bear fruit[1]. This good understanding between the medical and administrative services has been generally maintained in the various areas, and has contributed largely to the common welfare. The medical prophylactic service remains independent. The chief medical officer of each area is free to draw up his own annual plan of campaign and to carry it out subject to the supervision of the Director of Public Health. He sends copies of his reports to the Head of the District in whose territory he has been working. The latter then forwards them to the Lieutenant-Governor, who submits to the Governor-General every six months his observations on the work of the prophylaxis areas in his colony. (Order dated January 22nd, 1921.)

It is essential, above all things, for area medical officers to be acquainted with the situation as regards sleeping-sickness in their area, and their first work is to determine the *endemic index, i.e.* the percentage of sleeping-sickness cases to persons examined. We agree with Dr. Ouzilleau that it would be desirable to make this index correspond with a definite geographical administrative unit, which could easily be determined and would permit of a ready comparison between the work done — often at intervals of several years — by different medical officers. In view of the continual migration which takes place among the natives, the index calculated for each village is inadequate. It should be supplemented by an index for considerable areas, which should be as definite as possible, in order to diminish the opportunities for error.

The area medical officers draw up quarterly reports of their tours, showing for each village the number of persons inspected, the discrepancies revealed by the census figures, and the number of previously known and new cases of sleeping-sickness, separate figures being given for men, women, and children. These particulars must be entered in the *Area Register*, which is kept constantly up to date. With a view to assisting the area medical officers in their immense task, the Public Health Department has very properly adopted a model form for *Statistical Tables* of the results of prophylaxis. It has also laid down definite rules for determining the indices, and has requested that *Maps* on the scale of 1,500,000 should be printed for distribution to every area, which should revise them annually and give the endemic index for the various groups.

Laboratories.

The *Ayos* laboratory in the Cameroons, the *Libreville* laboratory in the Gabon, and the Pasteur Institute at *Brazzaville* in the Middle Congo, perform the following duties :

1. They act as centres for the study of sleeping-sickness, and the execution of protective measures ;

2. They carry out research in connection with treatment, sources and channels of infection, etc. ;

[1] Gustave Martin : L'existence au Cameroun, in *Prophylaxie de la maladie du sommeil*, p. 212. Ouzilleau : La maladie du sommeil. *Bulletin de la Société de Pathologie exotique*, April 14th, 1915.

3. They serve as instructional centres for doctors and European or native hospital assistants intended for the prophylactic branch.

Every doctor arriving in the Cameroons or the Congo is obliged to take a month's course of instruction in the discovery and treatment of sleeping-sickness. The instruction, which is of a purely practical nature, involves participation in all the work, including tours in the bush.

Our native assistants are also given very thorough technical instruction[1], as they are capable of making valuable contributions to the work of prophylaxis under the vigilant supervision of the medical officer and the Administrator.

Although the native should never be given an entirely free hand, he may, under European supervision, be of use in various operations, such as the testing of the blood and the glands for trypanosomes, or the work of injection ; but it is absolutely essential that he should be trained in a special subject and given a fixed duty according to his capabilities.

The course for European assistants at the Brazzaville laboratory lasts for two months (Art. 5 of the local Order of January 22nd, 1921) ; the course for native assistants lasts five months. These natives must be able to read and write, and must undertake to serve in an area for three years. (Local Orders of January 22nd and July 12th, 1921)[2].

In 1920 the courses at Brazzaville were attended by 7 European and 37 native assistants (14 of whom did not obtain their certificates), and those in the Cameroons by 31 male native assistants and 1 female, most of whom belong to the Yaoundé tribe.

The Ayos, Libreville and Brazzaville laboratories investigate and treat the cases of sleeping-sickness occurring in their respective centres.

At Libreville, in 1920, 2,648 persons were examined and 137 cases, including two Europeans, were discovered.

At Brazzaville, in 1920, 16,319 natives were examined and 247 cases observed. 321 Europeans were examined and two cases discovered.

In 1921, 15,422 natives were examined and 213 cases discovered ; the figures for Europeans were 532 examined and 4 cases (one not previously known).

Between 1907 and 1921, the Brazzaville laboratory examined 107,846 natives and discovered 3,257 cases of sleeping-sickness ; 3,106 Europeans were examined and 38 cases diagnosed.

The index is falling perceptibly. It dropped from 7.4 % in 1910 to 1.3 % in 1921

The Pasteur Institute provides treatment for Europeans, and not only treats cases in the villages, but also gives " out-patient " treatment to a certain number of natives who regularly visit the laboratory for injections. The number of cases treated in this manner was 281 in 1918, 313 in 1919, 328 in 1920 and 354 in 1921.

At the suggestion of the Minister for the Colonies and of Medical Inspector-General Gouzien, a *Decree* was passed on *August 6th*, 1920, making it compulsory for *all persons* leaving the Colonies in the French Equatorial Africa Group or the Cameroons to be examined for trypanosomiasis. This examination has to be carried out at the laboratories. Persons found to be infected with parasites are given a sterilising injection of atoxyl or clearing before they leave. This is the first step in the curative treatment which is continued during the journey.

Prophylaxis Areas [3].

The whole of the infected region of French Equatorial Africa (and apart from the Chad territory there are few districts which are completely free) has had to be divide

[1] Dr. Jamot : De l'utilisation des naturels de l'Afrique équatoriale française pour la lutte contre la maladie du sommeil. *Annales de Médecine et de Pharmacie coloniales*, 1921, No. 1, p. 85.

[2] *Annales de Médecine et de Pharmacie coloniales*, No. 1, 1921. p. 129.

[3] See Map D.

into imaginary *prophylaxis areas*, of which there will be 19 when the organisation is complete. At present there are only 10, each of which is directed by a European doctor, who is continually travelling and is assisted by one European and about 10 native assistants. Each medical officer is provided with a special medicine chest, the contents of which have been determined by the Pasteur Institute in Paris ; and this chest contains all the material for research and treatment which the doctor requires when on tour[1].

In addition to the Upper Nyong area in the Cameroons, we find in the Gabon, the Middle Congo, the Upper Ubanghi, and the Chad territories the following areas, each of which, in French Equatorial Africa, bears a number, the smallest number belonging to the first area established :

Cameroons Area : Upper Nyong (Ayos).		
Area No. 10.	The Gabon-Comoestuary (Libreville).	
» No. 8.	Lower Ogoué (Lambaréné).	
» No. 9.	Upper Ogoué (Franceville).	
	Middle Ogoué.	Three areas to be established in the Gabon.
	Makoko-Lastourville,	
	Mayombe.	
» No. 6.	Loango-Ludima (M'Tim).	
» No. 4.	Jue-Ludima (Ludima).	
» No. 10.	Brazzaville (Pasteur Institute).	
	Middle Congo (2 areas).	Four areas to be established in the Middle Congo.
	Lower Sangha (1 area).	
	Upper Sangha (1 area).	
» No. 2.	Ibenga-Motaba (Impfondo).	
» No. 5.	Lobai-Uahm-Fafa (Bossongoa).	
» No. 1.	Upper Chari (Dekoa).	
	Mobaye in the Upper Ubanghi.	Two areas to be established in the Upper Ubanghi.
	Bangassu in the Upper Ubanghi.	
» No. 7.	Upper M'bomu (Zemio).	
» No. 3.	Chad or Fort Archambault.	

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1. Cameroons.

The Upper Nyong area, which was established by order of the Commissioner of the Republic in April, 1920, includes the administrative subdivisions of Akoloninga (district of Gaundé) and Abong-M'bang on the Nyong, together with the subdivision of Dumé. It is crossed by the main line of communication from the great port of Duala to the Congo, which connects the navigable waterways of the Nyong, the Dumé, the Kadei and the Sangha.

The medical centre of prophylaxis is situated at Ayos, in the most seriously infected district in the area, on the right bank of the Nyong, 45 km. from Akoloninga, and opposite the confluence of the Long-Mafog and the Nyong.

The area staff consist of two medical officers, 36 native assistants, 1 native secretary, 16 local guards and 50 porters and canoemen.

[1] Inspector-General Gouzien : La lutte contre la maladie du sommeil. *Annales de Médecine et de Pharmacie coloniales*, 1921, No. 1, p. 91.

The equipment includes six microscopes. The area, which lies between the great equatorial forest to the south and the giant grass plains to the north, extends over lofty plateaux at a height varying from 500 to 700 metres. Vegetation is rank in this region, which is a network of marshes and streams. The district to the north-east of Dumé has been formed into a sub-area under a medical officer.

The centres of the area are three principal stations, each of which is furnished with bacteriological material for laboratory work. These stations are at *Ayos* (1 doctor, 16 male native assistants and 1 female) ; at *Akoloninga* (10 native assistants) and at *Dumé* (1 doctor and 10 native assistants). There are also two specialist hospital assistants on detached duty, one at *Garua* and the other at *Duala*.

On October 8th, 1921, 7,061 known cases of trypanosomiasis had been treated with atoxyl (3,669 at Akoloninga, 1,938 at Ayos, and 1,454 at Dumé)[1].

2. Gabon.

By an Order dated March 16th, 1922, the Gabon territory — for the prophylactic work in which the Libreville laboratory was responsible — was formed, as from February 1st, 1922, into a prophylaxis area under the title of " Area No. 10 : Gabon-Como Estuary ". It covers the whole administrative district of the same name.

The chief medical officer of the area is the director of the *Libreville* laboratory.

The Upper Ogoué area (Area No. 9), which was formed by an Order dated May 21st, 1921, is bounded on the south by a straight line passing through Zanaga, Omoi and Massandjo. The centre of the area is fixed at Franceville. No medical work has ever been done in this region. Dr. Ambiel was able to examine 4,300 natives, 900 of whom had sleeping-sickness ; but before he had been at work long enough to obtain satisfactory results he was recalled to Lastourville on account of a smallpox epidemic.

The Loango-Ludima area (Area No. 6), which was formed under an Order dated December 11th, 1920, is bounded on the west by the sea, on the south by the Belgian Congo, on the east by the Djué-Ludima area, and on the north by the Kuilu as far as its confluence with the Niari. The centre is fixed at *N'Tim*.

Dr. Cavaud has examined 13,186 persons, 1,180 of whom had sleeping-sickness, though only 65 showed advanced clinical symptoms. All were treated with atoxyl.

The Djué-Ludima area (Area No. 4), was formed by an Order dated November 22nd, 1919. It is bounded on the east by the Djué, on the south by the Congo and the frontier of the Belgian Congo, on the west by the Kimongo-Ludima road and the Niari, and on the north by the roads from Sibiti to Muyonzi and from Muyonzi to Renéville. The centre is fixed at *Ludima*.

This and the neighbouring area (Area No. 6) are the two smallest areas in Equatorial Africa. Their size was restricted at the time of their formation, owing to their importance and to the necessity of taking the utmost care to stamp out sleeping-sickness in this district, through which passes the railway from Brazzaville to the sea, and in which most of the shipyard workers reside.

The work done in this area during 1921 may be summarised as follows : 44,606 natives were examined, and 2,585 old and 688 new cases of sleeping-sickness were reported, all of which were treated with atoxyl.

[1] Lépine : La prophylaxie de la maladie du sommeil au Cameroun. *Annales de Médecine et de Pharmacie coloniales*, No. 2, 1921. — Jojot : Le secteur de prophylaxie de la maladie du sommeil du Haut-Nyong. *Annales de Médecine et de Pharmacie coloniales*, No. 4, 1921.

The LOWER OGOUÉ-BONGO AREA (Area No. 8) was created by an Order dated February 15th, 1921. It contains the administrative district of the Lower Ogoué and the Bongo and a portion of the Urungu districts. The centre is fixed at Lambaréné.

During his four months' work in this area, Dr. GEORGELIN carried out 19,953 examinations. He found only 209 cases of sleeping-sickness, but as Dr. LEBOEUF observes, Dr. SCHWEITZER, a retired doctor attached to the Evangelical Mission in the Ogoué, has stated that he observed a large number of cases in the Lower Ogoué region, where he carried out a considerable number of atoxyl injections. We should therefore be cautious in our estimate of the situation, which is doubtless due in part to the atoxylisation which has been carried out ; we have thus every inducement to persevere in the same direction (Dr. BOYÉ).

The Public Health Department proposes to form in the GABON three new areas, comprising all that part of the Mayombe and the Middle Ogoué which lies between Area No. 8 to the west and Areas Nos. 6 and 9 to the east.

3. Middle Congo.

The territory of the Middle Congo entrusted to the Pasteur Institute of Brazzaville extends over a radius of about 60 kilometres round the capital.

It comprises the districts of Boko-Kinkala-Renéville, and on the river, the district known as the " Couloir " extending from Stanley Pool as far as the Lefini on the right bank of the Congo. In 1921 the probationer medical officers carried out several inspections : (1) At Boko-Kinkala, Kimpanzu-Linzolo : 11,219 natives were examined and 157 cases of sleeping-sickness observed, 97 of which were new ; (2) At Renéville and Mayama : 2,516 were examined, 17 old and 25 new cases discovered ; (3) In Stanley Pool : 1,914 were examined, 444 cases were found of which 138 were new.

The total number of examinations made by the staff of the Pasteur Institute or by the probationer medical officers in the course of the year was 31,603. They yielded 383 old cases (one of whom was a European) and 329 new (one of whom was a European). All were sterilised or treated.

The Ibenga-Motaba area formed by the Order of January 18th, 1919 (No. 2 Area) is bounded on the south by the post of Impfondo, on the north by the mouth of the Lobai, and on the east by the Ubanghi. The centre is Impfondo.

This area has been fortunate enough since its establishment to be under the control of Dr. PIOT, Dr. CLAPIER, and, at present, Dr. DELINOTTE.

So long ago as 1914 Dr. OUZILLEAU [1] had seen nearly 20,000 natives. He had examined them by roll and treated 2,016 cases.

In 1919, Dr. PIOT visited 12,420 persons and examined 2,302 of them microscopically. He found 1,003 cases of sleeping-sickness (225 men, 284 women, 494 children) about 8 % of the total population and 43 % of the natives examined. All received a dose of atoxyl. A second dose could only be administered to 33 % of them and a third to 10 % [2].

In 1920, Dr. CLAPIER gave 10,133 injections to 3,147 patients.

In 1921, Dr. DELINOTTE examined 51,679 natives. Among this total he found 2,103 old cases previously diagnosed and 893 new cases. He gave 7,963 injections of atoxyl. Every patient received at least two injections. Three-quarters of the population were examined twice in the course of the year.

The *Lobai-Uam-Faja area* (No. 5 district) created by Order of December 16th, 1919, was not able to begin work until June 1921. This area, the centre of which is Bossangu,

[1] OUZILLEAU. *Bulletin de la Société de Pathologie exotique*, December 8th, 1920.
[2] PIOT : Sur le fonctionnement d'un secteur de prophylaxie. *Bulletin de la Société de Pathologie exotique*, May 1920.

is bounded on the south by the left bank of the Lobai ; on the west by the Lobai and the post of Bozum ; on the north by the Uam ; on the east by the Fafa and the Ombelli, and on the south-east by the Ubanghi.

Dr. BOSSERT visited 308 groups in the subdivision of Damara and Marali with, according to the census, 59,316 inhabitants. He contrived to see 46,845 of them and found among them 477 cases of sleeping-sickness, all of whom were given two atoxyl treatments with a week's interval between.

In the Middle Congo *four new areas* will have to be formed — two between Brazzaville and the Ibenga-Motaba area, one in the Middle Sangha and one in Upper Sangha.

4. In the Ubanghi-Shari-Chad Territory.

The *Upper Shari area* (area No. 1), created by the Order of February 18th, 1921, is bounded on the west by No. 5 area (Lobai-Uam-Fafa area) extending as far as No. 3 area by the Uam River ; on the north by No. 3 area (Fort Archambault) ; on the east by the course of the Bamengi, of the Koukourou, of the Uaka and of the Kouango ; on the south by the right bank of the Ubanghi. Its centre is Dekoa.

This area was working in 1920 with one European hospital assistant. Since the beginning of 1921, Dr. DE BOYER DE CHOISY has been in charge. The figures showing the number of natives examined and treated bear witness to the importance of the work he has accomplished : 99,223 patients were visited, 2,706 old and 1,801 new cases were given atoxyl treatment, 1,012 of whom were from districts never previously visited by a medical officer.

This is the area which Dr. JAMOT organised and directed from July 1917 to August 1919. During this period, among 89,743 natives examined he found 5,347 cases which were treated with atoxyl or by the neo-arsenobenzol-atoxyl method.

The *Upper M'Bomu area* (No. 7 area) was formed by Order of February 16th, 1921, and is bounded on the east by the Anglo-Egyptian frontier of M'Bomu at the source of the Chinko ; on the west by the course of the Chinko ; on the south by the course of the M'Bomu.

The centre is Zemio.

Dr. GILLY, chief medical officer of the area, arrived at Semio on June 16th, 1921. In the course of six months of that year he examined 16,875 natives, among whom he traced 2,203 cases. Of these patients, 1,499 received two injections of atoxyl, 853 three, and 124 four.

In the subdivisions of Rafaï and of Bangassu, the prophylactic service has been undertaken by the medical officer of the Rafaï post. At Rafaï, among the 412 natives seen, 32 cases were discovered ; at Bangassu among 358, 25 cases.

In *Upper Ubanghi* steps are being taken for the creation of two new areas between No. 1 and No. 7 areas, one extending from Kuango to the Kotta (Mobaya district), the other from the Kotto to the Chinko Bangassou district.

The *Chad area*, or Fort Archambault area (No. 3 area) was formed by order of May 30th, 1919.

This area, bordered on the south by a line passing through Lere, Gore, Kabo, and N'Dele, is by far the largest. From west to east it extends over about 1,100 kilometres from the Cameroons to the Egyptian Soudan. It is of considerable importance not only on account of the number of cases found in certain tracts but also in view of the necessity of raising a barrier against the spread of the disease to the regions of the North, hitherto immune. The chief medical officer of this area, the centre of which is Fort Archambault,

has under his orders two European hospital assistants and nine native assistants. He is in charge of the three observation posts of Laï, Lere and Fort Archambault, which are responsible for the inspection of travellers towards the Chad and he supervises an isolation camp at Fort Archambault.

Until March 1921 Dr Muraz, and since then Dr. Le Coz, have carried out chemical and administrative prophylactic work with a zeal and energy which have yielded excellent results in this area.

Some important endemic foci in the Mayo-Kelbi, the Middle Logona and the Middle Shari districts have been isolated in this way.

In 1921 the chief medical officer of the area visited 183,477 inhabitants and treated 10,075 cases, 1,328 of which were new. The staff of the observation posts inspected 44,295 natives and treated 2,543 cases, of which 277 were new.

Of a total of 227,772 cases inspected, 12,618 patients received atoxyl treatment

Observation Posts.

Together with the creation and the smooth working of the prophylactic areas, one of the measures taken by the health service has been the establishment of *sanitary cordons*, comprising centres for examination and detention at the points of outlet of the more important of the great infected zones on the established caravan route, in order to protect the territories hitherto immune. Moreover, a *local Order of April 12th*, 1917, in Equatorial French Africa provides that no native shall be free to leave a prophylactic area by any point other than by an observation post unless he is in possession of a medical passport.

In the Cameroons, relations between the area and the outlying territories are maintained by " filter posts ", entrusted with the supervision of road and river traffic. The administrative passport, which natives require when leaving one subdivision for another, has to be endorsed by the medical authorities of the area. Patients in the cleared stage are notified to the administrators and to the medical officers of the divisions to which they are going. The individual concerned carries his personal medical card showing the treatment adopted. Control posts are in operation at Akonolinga (for the Dumé-Akonolinga-Jaundé route and for the river passage Abon-M'bang-Akonolinga-Phala-Bessa) and at Dumé.

New posts should come into operation at Bertua (on the Dumé road northwards), at Bimba (on the road towards Equatorial Africa) and at Gele-Undi (on the Jaundé-Dumé road.)

In Equatorial Africa, a sanitary cordon was drawn across the northern boundary of the infected districts on the Lere-Laï-Fort Archambault-N'Dele line, in order to protect the populous centres of the Chad from the Congo scourge. The territories to the east of the Shari-N'Dele-N'Timana line are immune, and this also applies to the districts to the west of Kibo (Mayo-Kilbi) as far as Lere and the Cameroon frontier.

Sleeping-sickness at present affects the riverside populations of the Bahr-Sara, of the Nana-Baria and the Logona as far as Laï. There is a smaller focus, but a very virulent one, at Shoa on the Tandjele. This focus, notified by Dr. Bouillez in 1915, re-notified by Muraz in 1919 (52 %) continues, to prove a dangerous centre of infection (Le Coz : 75.14% in 1921).

The three observation posts of Fort Archambault (Middle Shari) of Laï (Mid-Logona and of Lere (Mayo-Kelbi), which have been working since May 1920, mark approximately the northern boundary of the sleeping-sickness area. Strict instructions are given to the village headmen on the imaginary line linking one post to the other. It is their duty

to direct every traveller, trying to make his way north without passing through the " filter post ", to the administrative centre.

These posts[1] are in charge of specially trained hospital assistants under the local administrative officers. At the outset, their duty was confined to sifting the travellers, to noting their numbers and to sending suspects on to the mobile sanitary column in charge of the medical officer. Except at Lere, where the traffic is less important than at the other two posts of Fort Archambault and of Laï, those posts have now been changed into observation centres with treatment by atoxyl where the cases of sleeping-sickness are diagnosed, provided with medical cards, and entered on the observation registers. The medical passports are endorsed or made out. All patients suffering from sleeping-sickness are forbidden to proceed northwards. When a case of special urgency occurs, on which the Administrator alone is competent to decide, permission to continue his journey is given to the patient after he has received two injections of atoxyl at a week's interval. He is specifically instructed that the length of his journey must not exceed five months there and back.

The activity of the posts also extends over a radius of 25 kilometres. Fort Archambault, more especially, deals with the junction of the Bahr-Sara and the Shari, which has a high degree of morbidity. Laï watches over the epidemic centre of Shoa and the junction of the two Logonas, which has suffered severely.

Between May 1920 and April 1921, 13,025 natives were inspected at Fort Archambault and 148 cases (1.13%) were diagnosed, 25 cases were detained at Laï and two others at Lere, in all a total of 175 cases of sleeping-sickness.

Treatment Stations.

A prophylactic area should possess the European staff necessary to enable it to carry out simultaneously with the *itinerant prophylactic treatment* which is extensively and energetically practised in the bush — methodical treatment in " isolation villages " and " isolation camps ". Moreover, it is humane and essential to the success of our medical policy to house incurable cases of sleeping-sickness and those in a delirious and dangerous state.

The natives, in certain quarters at any rate, are beginning to appreciate the benefits of atoxyl treatment which, restores a certain degree of strength to the patient, but they have been quick to discover that a double injection of atoxyl after an interval of between four and five months is not sufficient to effect a cure.

It would seem, the refore, thatthey would welcome the organisation of stationary medical posts where they could receive regular treatment for as long a period of time as might be required (Dr. Boyé).

In the *Cameroons*, the new " Ayos " rebuilt in 1920 comprises a sleeping-sickness hospital built on a hill which has been cleared of bush ; roads have been marked out and drainages for the surface water dug ; all the fields have been put under cultivation, mainly for sweet potatoes.

A brick bungalow of three wards accommodates cases of sleeping-sickness which require isolation (cases detained and mentally affected), a fence encloses six big huts for the patients, a kitchen and the shelters for the native douche baths. A hut for the hospital assistant on duty is situated outside the enclosure so as to enable him to keep all the buildings occupied under observation.

[1] Dr. G. Muraz : Travaux des secteurs de prophylaxie du Tchad. *Bulletin de la Société de Pathologie exotique*, April 12th, 1922. Vol. XV, No. 4.

Three springs, two of which have been caught and covered in, rise at a convenient distance from the settlement and furnish a supply of very pure water.

From September 30th, 1920, to May 1st, 1921, the number of patients admitted was 121 men, 180 women, 21 children, 322 in all, with a death rate of 2%.

At Libreville, a treatment station has now been arranged consisting of two mud-and-wattle shelters divided into five wards. The whole building affords accommodation for about 60 patients. Further, an isolation bungalow with four wards, each of which can take in a case of sleeping-sickness in the mental stage, is available.

A plantation of manioc and sugar cane close to the camp is cultivated by the patients themselves. The problem of food supply is one which is becoming more and more urgent owing to the increasing food shortage among the natives in the Gabon ; more especially since the opening on the outskirts of Libreville of big timber yards which employ a large number of hands. In 1921 the Libreville station took in 147 patients.

For the Loango and Jue areas the organisation of a single centre near Loango, where a medical officer is in residence, had been planned, but with the exception of the Bavilis, inhabiting the coast, all the other tribes of the territory greatly dread a sojourn of any length on the coast. The Director-General of the Medical Service is suggesting the institution of three camps, one near Loango, another at Loudima, a third at N'Tima.

At Brazzaville[1], the sleeping-sickness settlement, the first buildings of which were erected at the beginning of 1910[2], is situated about 1,500 metres from the town on a plain which is an extension of the quarter called "The Plateau ", on high ground above the Congo on which the majority of the administrative buildings of the town are built.

While under the control and authority of the Administrator, the Mayor of Brazzaville, the village is under the medical direction of the Pasteur Institute.

The village, which was provided with a native village headman, a European hospital assistant, a native hospital assistant, an outpost consisting of a corporal and eight troopers, is at present notoriously understaffed (one native assistant surgeon, one native hospital assistant and a policeman).

Buildings and out-houses comprise :

(1) A bungalow containing three wards built of bricks and covered with galvanised iron, a kitchen and four outhouses for the accommodation of the hospital assistant and of the police orderly.

(2) A stone bungalow with a galvanised iron roof, comprising four wards, each of which accommodates 4 to 6 patients (infirm and mentally unsound).

(3) Three stone bungalows, each divided into six wards, with accommodation for two patients apiece, 36 beds in all.

(4) Isolation building for the mentally affected. This comprises nine cells of different dimensions which can take in 20 mental cases at most.

The courtyard on which the doors open is enclosed by a wall. This enclosure allows the patients to be given a certain amount of liberty during the day.

A stream of excellent water is close to the hospital. Steps are being taken to get the natives to cultivate the village land as far as possible; the soil, however, is very poor. Such of the inhabitants as are not sick are cultivating manioc and sweet potatoes ; young fruit trees have also been planted (Date palms, mango trees, orange and lemon trees).

An efficient European hospital assistant should be placed in charge of work of this kind. He should realise that the duty of the assistant to the medical officer in a hospital

[1] Aubert and Heckenroth : Village d'isolement à Brazzaville. *Bulletin de l'Institut Pasteur*, 1911, p. 699.

[2] G. Martin and Ringenbach : Prophylaxie de la maladie du sommeil à Brazzaville en 1910. *Bulletin de la Société de Pathologie exotique*, October 12th, 1910.

of this nature is not only to give injections, and apply dressings, to distribute food rations, and to look after certain papers, but by patient efforts to improve the surroundings in which the patients live and thereby to advance their moral and physical well-being. (Dr. LEBŒUF.)

In 1921, 238 cases were admitted and treated in the village, 56 deaths, 7 escapes and 186 dismissals in the ordinary way were recorded.

From 1914 to 1921 the figures of admission were 158 in 1914 with 83 deaths ; then successively 213 (48 deaths), 194 (71 deaths), 136 (60 deaths), 149 (73 deaths), 75 (37 deaths) and 226 (60 deaths) in 1920.

At Bangui, the hospital, situated 2½ miles from the town a little to the west of the carriage-road from Crampel, comprises some round clay-built huts and a shelter with several wards for mental cases. The patients are visited once a week by the medical officer in charge and undergo regular treatment. In 1919, 160 natives were treated in this hospital.

In the Upper Shari a treatment-station is working in the centre of the district at Fort Sibut where there is a medical officer of the auxiliary medical service.

Owing to the fact that medical attention is always available, the patients there have every opportunity for complete therapeutic treatment.

In the Grimari district, on the advice of Dr. DE CHOISY, the head of the sub-division has had an isolation village for cases of sleeping-sickness built as an experiment. Cases of sleeping-sickness are, however, rare in comparison to the total number of natives, and it is advisable to isolate such patients since they are a source of danger to the rest of the population.

In the Chad region there are two isolation camps, one at Laï, the other at Fort Archambault, the latter comprises two brick buildings with tiled roofs. A wall encloses the following buildings : the receiving ward and the treatment ward, men's ward, women's ward, the quarters of the hospital assistant on duty, isolation ward for the delirious, wells, kitchen, etc. 174 patients were admitted to this camp and given medical treatment in 1921.

AGRICULTURAL AND ADMINISTRATIVE PROPHYLAXIS.

All the District Medical Officers point out the importance of fighting the glossinae which are carriers of the endemic disease and also the stinging insects which are largely responsible for the hut and family epidemics. They agree on the necessity of chemo-therapeutic prophylaxis, side by side with agricultural and administrative prophylaxis. The provisions of the Order of April 17th, 1917, relating to the clearing of undergrowth from the surroundings of the villages and watering-places are not carried out thoroughly enough. Nor has it been possible, owing to the shortage of administrative and medical staff at the stations, to exercise the strict supervision over the movements in the interior of the colony of natives for whom the possession of a medical passport is compulsory.

Wherever deforestation has been effectively carried out the glossina has disappeared. This operation, more especially as carried out in the Middle Kelbi country at the intersection of the roads from Laï to Kelo and the Tandjele has destroyed the breeding places of the *Glossina palpalis* there and the river can now be crossed without the risk of attack from flies.

On the banks of the Niari, which at many points run parallel to the railway, Dr. GUILLET discovered that the cause of infection all along the river lies to a great extent in the tall reed beds, three to four metres in height, on the river banks and in all watercourses.

They grow in dense, impenetrable masses and swarm with glossinae. In certain villages the spread of sleeping-sickness has been started by the destruction of the reed beds in the neighbourhood. For the safety of the workers on the railway[1], wherever the line crosses or runs parallel to a watercourse, destruction of these reeds has been begun by pulling them up by the roots during the dry season.

> " In a zone which has suffered severely, the Pende and the Logone flow close to a broad granite range where the boring of wells is impossible. Villages at more than 15 km. distance from the river get their drinking-water from the Pende. For a fee paid either in millet or in *sal* (a bar of iron worth 0.25 frs.) they keep up relays from village to village to supply their daily supply of drinking-water ; this astonishing system obtains throughout the whole of the dry season from November to June. The inhabitants who are too poor go themselves to draw the water from the Pende and cover very great distances. Even if villages in this territory were to be removed, the inhabitants would continue to frequent the banks of the Pende with its many breeding-places of *Glossinae palpalis*. Thorough clearings, therefore, have been made on the banks of the river. It is a very big undertaking because the distance from Laï to Gore is about 200 km., but by carefully dividing the work between the villages on the banks of the Lagone-Pende, this undertaking has become practicable. Just as the upkeep of the roads is carried out in sections from Laï to Gore, the villages which are responsible for the upkeep of the roads are also made responsible for the sections of the banks continuously cleared. This method of prophylaxis is less complicated and a wiser policy than the German system of prohibited zones[2].

The policy of removing villages which are unfavourably situated and of rebuilding them on sufficiently high sites, and at a certain distance from watercourses, has proved very efficacious. The village of Bakoundite (on the upper Shari) where Dr. Jamot had found 33 % of cases is a striking example. The village was removed three years ago and, although there are still 26 cases, there is only one of fresh infection. It should be mentioned that Atoxyl treatment was frequently applied.

In certain sub-divisions the possibility of centralising small settlements scattered along the great channels of communication has been considered.

> " In the Lower Ogoué district the sub-division of Lambaréné comprises about 400 villages and a population of 18,000. All these villages have been overrun by the bush and the clearing of them would be impracticable. The scattered settlements should be centralised. It would be possible to reduce the number of villages from 400 to 60 or 80, *i.e.*, with an average of about 250 inhabitants. Administrative as well as medical work would be greatly facilitated by such a measure (Dr. GEORGELIN)."

The Health Service has called the attention of the administrative authorities to the necessity of improving the general conditions of native life, especially that of persons interned in huts[3] and to the desirability of encouraging the natives to plant and cultivate foodstuffs.

The Congo negro is for the most part underfed. His apathy and his incapacity for hard work are in the first instance the consequence of this physical deterioration which at the same time makes him more susceptible to infections of every kind.

[1] Among 5,283 railway workers from Brazzaville to the coast line 65 sleeping-sickness cases have been traced.
[2] In the M'Bomou zone they furnish 80 % of the cases of sleeping-sickness. — Dr. OUZILLEAU : *Bulletin de la Société de Pathologie exotique*, April 14th, 1915.
[3] Dr. MURAZ : *Bulletin de la Société de Pathologie exotique*, No. 4, April 12th, 1922, p. 262.

Conditions under which natives are so busy collecting rubber and endeavouring to meet the yearly tax, that they have to leave their plantations uncultivated, should not be allowed to continue.

The gathering of rubber should be regulated.

> " The natives should not be constrained to lead for a period lasting several months a wretched life under lamentable hygienic conditions without regular food supplies and in huts put up in haphazard fashion. It is of the greatest importance, as a preliminary to all exploitation that employers should be able to provide fields for cultivation and villages on appropriate sites near the rubber plantations, so that their employees, constrained to a severe and enervating work, should at least be assured an indispensable minimum of material comfort. It is to be wished that the steps already taken by certain companies should be adopted by managers of business undertakings of every kind (Dr. HUOT) ".

In the *Chad District* the Governor-General Augagneur has decided on the abolition of porterage on the line of relays by river traffic as far as Batangafo. This important measure will certainly reduce the incidence of sleeping-sickness, because the general health of the native will no longer be sapped by very great efforts which undermine his strength and lead to deterioration[1].

In the sub-division of the Maralis the natives have been exempted from all taxes and from all work and of recent years treatment by atoxyl has, thanks to the assistance of the administration, been carried out with great thoroughness. As a result the number of fresh cases in 1921 remained trifling.

The Medical Inspector, M. THIROUX[2], has long rightly insisted on the advantages which might be obtained by individual prophylaxis and the education of the native, by teaching the black man to recognise an enemy he does not know. The last commission of the *Société de Pathologie exotique* [3] again drew attention to the necessity of educating the natives by means of meetings and palavers, and expressed the wish that the village headmen should look after the sick and, under the supervision of the administrative authorities should ensure the execution of deforestation measures.

In a very large number of areas these recommendations have not yet been carried out.

RESULTS AND CONCLUSIONS.

The Service entrusted with the prophylaxis against sleeping-sickness accomplished notable work in 1921. Figures quoted from the report of the principal medical officer, M. BOYÉ, the Director of Health Service in French Equatorial Africa, show that : In the whole of the areas[4] 550,658 natives were examined ; there were among them 18,800 old cases of sleeping-sickness already diagnosed in four areas ; 9,789 new cases were diagnosed, making a total of 28,589 cases, *i.e.*, 5.18 per cent of the natives examined. All these natives have been treated with atoxyl from two to five times, some of them oftener.

Adding to the foregoing figures the 7,061 cases diagnosed in the Cameroons and given atoxyl treatment, the general result shows that 35,650 natives were kept under regular observation and treatment.

Atoxyl treatment has everywhere shown immediate satisfactory results. Apart

[1] ROUBAUD : Le bien-être dans le paludisme et les trypanosomiases. *Bulletin de la Société de Pathologie exotique*, No. 10, 1921.
MURAZ : *Bulletin de la Société de Pathologie exotique*, 1922, No. 4, p. 280.

[2] THIROUX : L'éducation des colons et des indigènes et la prophylaxie individuelle dans la maladie du sommeil. *Bulletin de la Société de Pathologie exotique*, No. 9, 1910.
Gustave MARTIN : Propositions de vœux à émettre, *Bulletin de la Société de Pathologie exotique*, No. 9, 1910.

[3] *Bulletin de la Société de Pathologie exotique*, Session of July 7th, 1920.

[4] Out of ten areas only five were able to work throughout the year in 1921, the five others for 7, 6, 4 and 3 months.

from its sterilising action which decreases the number of infectious cases, it also affects the general health of the patient and seems to have a good effect on the birth rate. Dr. DELINOTTE has kept under observation cases of infected women whose pregnancies had terminated in still-birth and who, as a consequence of the treatment, were restored to normal health and gave birth to healthy infants.

In several areas the number of new cases of infection remained trifling.

In the sub-division of Marali the death rate was reduced by 45 % in that of Fort Crampel by 43 % (Dr. HUOT).

Dr. JANOT[1] reported 2,071 deaths from sleeping-sickness for the year preceding his operations in Ubangi-Shari.

Having treated his patients either with atoxyl alone or with atoxyl in conjunction with neo-arsenobenzol, he returned for the year following the beginning of his activity, no more than 714 deaths, in other words, a reduction of 65 % on the previous death rate. All the epidemic foci found — and he noted some of great virulence — were brought under control. Finally, the examination of 753 patients who came up again for examination gave negative results in 598 cases, which means *a reduction in the whole of the virus in circulation* by approximately 80 %.

On the Lower Ubangi more than six years after energetic prophylactic treatment by atoxyl had been carried out and prematurely interrupted, Dr. CLAPIER was able to examine *a third* of the cases which had been previously diagnosed. In the case of 80 % of the convalescents after a thorough examination no more parasites were to be found. Thus, the final figure of these convalescents who appeared to have ceased to harbour trypanosomes in the lymph or in the blood was 28 %. Almost all these natives were leading a normal life in their usual surroundings.

In the Ibenga-Motaba area, of 1,072 cases diagnosed in 1914, 373 were identified on January 1st, 1921, and 341 on December 31st. The majority in a good state of health ceased to show parasites in their circulation. Working on the records of the last three years, Dr. DELINOTTE was able to establish the course of the disease in this district in accordance with the yearly percentage of new infections.

In the Impfondo district : 7.4 % of cases to the population in November 1919 ; 2.35 % new infections in June 1920 ; 1.35 % new infections in July 1921.

The preceding percentages are shown by the following figures in the sub-division of Ipenea : 6.01 % in 1919, 2.3 % in 1920, 0.76 in 1921.

In the Ibenga district 7 % in 1919, 1.7 % in 1920 ; 0.4 % in 1921.

On the banks of the Ubangi 13.8 % in 1919 ; 3.86 % 1920 ; 2.65 % 1921.

The coefficient of new infections in relation to the whole of the population seems to be on the decrease everywhere.

The present programme of the campaign against sleeping-sickness in the Cameroons and in French Equatorial Africa should be pushed on with the continuity and perseverance essential to all prophylactic work. Only by the frequent examination of new cases and their immediate and methodical treatment will it be possible to maintain the good results already achieved. New areas must be organised. The isolation camps are far too few ; they should be increased. One of the conditions of success is vigorous, effective and simultaneous action, not only in the most infected areas, but also in those which at the present moment are comparatively immune. In French Equatorial Africa an annual expenditure[2] of one million francs, allowing for the organisation of about 15 districts, is the irreducible minimum for which provision must be made.

[1] Dr. JANOT : *Bulletin de la Société de Pathologie exotique*, No. 5, p. 920, and *Annales de Médecine et de Pharmacie coloniales*, 1921, No. 1.

[2] In the Cameroons the estimates in the budget for 1921 provided for the prophylaxis of sleeping-sickness a total of 169,946 frs. (104,946 frs. for staff ; 65,000 for material.)

In many districts prophylactic work has been greatly assisted by the united continuous labours of the medical and administrative services. In concluding this report we would lay stress on the necessity for this close co-operation. Without it a great part of the population would be able to evade the medical officer, and the carrying-out of general prophylactic measures could be only a farce.

The reduction of the index figures of annual infection, the rise in the birth rate, the decrease in the death rate in certain communities which have been under atoxyl treatment and are well administered show the need for persevering on the road marked out and give reason for confidence in the economic development of our fair African possessions.

II. Belgian Congo.

(*a*) Dr. VAN CAMPENHOUT submitted Map E, which shows the regions from which cases of the disease have been reported, those in which such cases are numerous and those in which the malady constitutes itself a grave menace. In addition, there are shown those localities where sleeping-sickness is losing ground and those where it is making progress. It also, as will be seen, indicates various points in connection with the prophylaxis and treatment of the disease.

This map does away with the necessity of any lengthy account of its distribution. Attention need merely be directed to its close association with the rivers and the severity with which the riparian areas are affected. It will be seen that the disease is spread practically all over this vast territory though the newly-acquired Ruanda-Urundi in the extreme east is free of it.

(*b*) Dr. VAN CAMPENHOUT also submitted a copy of the Annual Report of the Belgian Congo for 1920 wherein it is stated that trypanosomiasis is the most wide-spread and severe of the diseases affecting the native population and that unfortunately the preventive and curative methods available are far from being decisive in their results.

Still, throughout the year an active campaign has been waged. Special medical missions have made great efforts in this direction. In the territory of Kikwit, where the disease is rampant, 75,654 natives have been examined. Of these, 8,922 or 12.1 per cent were found to be infected. All these have been given regular treatment. In the Lower and Middle Congo 4,463 cases came under notice, making a total of over 13,000 in these regions alone.

In the laboratory at Leopoldville, 18,942 natives were examined. In the south of the Uele district the disease is at a standstill. In the districts of Luluabourg and Lomani it is lessening and it also appears to be on the decrease between Kongola and Kikondja. In the Lulua district 1 per cent of natives are infected, in that of Lulonga 0.8 per cent, but in Bangala as many as 3 to 4 per cent. The banks of the N'Ciri are equally heavily infected.

(*c*) *Report for* 1921, also furnished by Dr. VAN CAMPENHOUT, shows that the following cases have been treated during the year throughout the whole Colony :

Congo-Kasai	Province	28,734
Equator	»	836
Eastern	»	5,126
Katanga	»	95
Grand total....		34,791

(*d*) An English translation of a memorandum in French on the prophylaxis of sleeping-sickness in the Belgian Congo, prepared by Dr. VAN CAMPENHOUT and presented by him to the Committee, is here included. It runs as follows :

Sleeping-Sickness.

Prophylaxis against sleeping-sickness amongst human beings has passed through various phases in the Congo, amongst these are :

1st method. — The first legislative act was the promulgation of a decree declaring sleeping-sickness to be a communicable epidemic disease. In 1899 the laboratory at Leopoldville was instituted, its special work being the study of sleeping-sickness.

Alarmed at the progress of the scourge, the Independent State of the Congo despatched in 1905-06 a mission to the colony consisting of Drs. DUTTON, TODD and CHRISTY. At this time King Leopold II instituted a prize of 200,000 francs for the discovery of a remedy. In addition to defraying the expenses of the expedition, King Leopold II granted for several years a subsidy to the Liverpool School of Tropical Medicine. At this period also the effect of atoxyl on man was tried, with varying success.

The routine established then was based on the following principle :

Sleeping-sickness cases infect tsetse flies. Cases should therefore be under observation and treated in a quarantine station. They should not move about, and their entry into a non-contaminated area should be forbidden.

A trial of out-patient treatment was directed in regulations and for this purpose two medical officers were attached to quarantine stations, one or the other of whom was to go out alternatively to the surrounding villages to detect new cases and *isolate* them. Previous to this, the medical passport with imprints of the left thumb for identification purposes was instituted.

The obvious shortage of the medical personnel was the reason why out-patient treatment could never be attempted. The Medical Officer stationed at the quarantine station for trypanosomiasis was inevitably kept for the general work of the station, especially to look after the white population. The regulation was no doubt on paper but it was absolutely useless. It was even harmful ; compulsory isolation, imposed as a military measure, proved disastrous. The natives ran away, avoided the visits, lay hid and spread the disease afar. The fear of the Medical Officer and his needle was such that entire villages fled and it became necessary, an unheard-of thing in the Congo, to protect some medical officers moving amongst the Bantu tribe.

To continue. The quarantine station has been done away with ; it is now really nothing more than an ordinary hospital, though it may still sometimes bear the name of a quarantine station. All sick, however, are treated therein, as is only sensible. Those under observation and those actually with the disease cannot spread infection. because their blood has been sterilized and the buildings are tsetse-proof.

2nd method. — Concurrently, and as a result of pressure from various quarters, an attempt was made at extended clearing and visiting of villages.

Preliminary Remarks. — Systematic clearing round European centres and certain native ones need not be discussed here. It should be noted that if the native would apply European methods of intensive culture and abandon cultivation in rotation a real advantage would result, as has been secured at Tanganyika.

Orders were accordingly given for clearing the glossina-infected river-banks of the Itumberi, Mongala and other streams on a large scale, special attention being paid to those bounding English colonies to the south and German to the north-east.

The results obtained were at the best negative, because in certain places where tall trees were cut down and left lying, there grew up in about six months a dense scrub in which the tsetses hid in their thousands. This useless expenditure of money and energy discouraged the Government and the medical men alike.

No one needs convincing that when a village is sufficiently wealthy to surround itself along the river banks with low-growing, well-kept plantations a kind of oasis will be formed in which the chance of infection by glossinae is reduced to a minimum ; but the application of the practice on a large scale, its generalisation to all villages is impossible and regulations to this end would inevitably prove abortive. In practice, many races in the Congo, and especially those devoted to agriculture, live in collective farms in very small numbers, or even in isolated families of one chief with his wives, his children and his slaves, all the available labour amounting to not more than three or four persons, women included. To direct these small communities to protect themselves by a clearing would be futile as a general measure.

3rd method. — Concurrently with clearing, the question of the resiting of villages was studied. This is impracticable in the greater part of the Belgian Congo and more especially in the districts most seriously affected. It is unnecessary to recall the attempts made elsewhere and in the Congo itself. We may mention, however, the fine results at Lake Victoria and in certain districts of the Katanga. The method is, in reality, not one at all. It is simply the abandonment of a tract of country for a more or less lengthy period, not to say indefinitely. Areas have been abandoned along the Lualaba in Belgian Congo (Katanga) and requisitions are at present being made for the placing of European establishments and even native villages on these sites. The question whether the flies there are still infective or not is unsolved, but certain medical authorities have proposed and permitted the establishment of native villages and agricultural centres for European colonists. Both types of settlers are required to submit to regular medical inspection and to any needful prophylactic treatment. As regards the European settlements I can only approve ; the question of the natives needs further consideration.

I note, moreover, that displaced villages are re-establishing themselves surreptitiously along the river banks, the excuse given being the lack of land and of fishing facilities.

The question of resiting must also be regarded from the point of view of policy and of native ownership. It is not sufficient to indicate to a village a more suitable site ; it must be ascertained whether the plot indicated has a legal proprietor (collective ownership is meant).

To conclude ; the method of shifting villages on to the heights or to places where glossinae are absent or few in number is of modified application in the Belgian Congo. It is hardly conceivable in areas which have no marked changes of level as, for example, the greater part of the equatorial districts, Lake Leopold II, the Bangalas and the Ubangi.

4th method. — The fourth method, which has forced itself progressively to the fore, is that of *sterilisation of carriers of the parasite.* The proofs of its efficacy need not be given here — temporary sterilisation, sometimes true sterilisation, and apparent cures after a course, often quite short, of atoxyl. It was advocated so early as 1910, but lack of personnel prevented its application.

I do not propose to discuss the value of any particular medicament (atoxyl, atoxyl-tartar emetic, " 205 "), but limit myself to an examination of the *modus operandi.*

Systematic sterilisation includes :

Methodical seeking for cases of the disease (new cases and relapses).
Long-continued regular treatment.
Strict control of movements of the native population and isolation, when necessary, of certain areas.

Investigation. Methodical detection of sleeping-sickness cases. — There are two methods : the first, a relatively simple matter, consists of relying on repeated palpation of glands. It is evident that this method will give a large margin of error, but it is

practical where the malady affects 10 to 15 or more per cent of the population. This is the method employed by Drs. SCHWETZ and DAVID of the medical mission of Kwilu (see p. 70).

The second means is to make systematic examinations of the blood of suspected cases, with centrifugalisation if possible. This method is indicated in regions where the number of patients is very small.

According to Drs. RODHAIN and BRODEN a systematic examination should also be made of the cerebro-spinal fluid. From a prognostic point of view the information as to treatment resulting from this examination is of considerable importance.

Itinerant or out-patient treatment. — As already noted, the quarantine stations, or rather the hospitals, are only for cases under observation, for natives and for *voluntary patients*. Here again two methods are employed. By one, as in the Kwilu Service, a region of massive general infection, treatment is carried out by the medical service practically in the village itself.

By the second, for use in a region where the cases are rare and scattered, the operator, a medical man or otherwise, resides at fixed posts not too far away and the patients come to him on appointed days. It is only on the occasion of the visits of the tax-collector that searches are made in the villages themselves.

According to reports from the S'Heeren Mission the malady is distinctly lessening in the Lower Uele. Save for the region of Gwane, which should be isolated, the centres of infection which menace this area are becoming less virulent.

In the Kwilu-Kasai the conditions are altogether different. Theoretically the scheme of the prophylactic mission is as follows :

The mission to consist of five medical officers. One medical officer, accompanied by a white sanitary agent and 12 native injectors able to write, enters a sector and instals himself in a village forming the centre of a group of about ten others. He discovers cases of the malady by means of palpation and clinical examination, records them and posts there a native assistant, with whom he leaves the European sanitary agent whose duty it is to supervise the native helper and set things going. The medical officer then proceeds to the next village and is followed in a week by the white sanitary agent. The same process is repeated until the 12 injectors are all posted, which takes three months. The medical officer then recommences his tour of inspection, starting at his first centre and devoting a further three months to supervising the application of the treatment, speeding it up, searching for new cases, establishing certain sanitary works, such as resitings and clearings. The region thus treated during six months is afterwards left alone for the next six months.

What are the results ? Dr. SCHWETZ writes in his last report :

> " At June 30th, 1922, out of the 10,196 cases treated in the first tour there were 15 % of deaths from all causes (sleeping-sickness, influenza, etc.), 2.5 % of the patients had passed into the last stage, that is to say become sleepers, and 25 % did not seem to have profited by the treatment. On the other hand, the heading " in good condition, no glands " covers 5,325 persons, that is 52 % — more than half. *This finding is the most important and the most encouraging.* Of course these 52 % cannot be regarded as complete cures ; the second examination will yield the most interesting information on this point ".

Personnel ; Preparation. — Medical personnel. — All colonial medical officers must, before appointment, have qualified by examination at the Tropical Medical School of Brussels or at a similar institution (School of Tropical Medicine of London, Liverpool, Paris or Lisbon). For promotion to the higher grades of the medical service there is

a practical examination to be passed at the end of a certain period of service in the colony. No special remarks are necessary regarding the duration and scope of the course.

Sanitary Agents. — In the Tropical Medical School of Brussels there is a section for junior staff. Sanitary agents (male nurses or other), nursing sisters, lay or religious, and missionaries of all denominations are admitted. It is even proposed that certain university students, for example, the holders of agricultural diplomas, should be made to follow the course.

White sanitary agents are very useful ; they double the efficiency of the medical men in the prophylactic compaign against trypanosomiasis.

The nursing sisters are specially useful in occupied centres ; their work as regards anti-trypanosomiasis prophylaxis is accessory.

The useful role which the missionary can fill is in direct relation to the encouragement given to him by the effective medical directorate and to his own devotion. The latter is always real, but the animating spirit, the direction, is often lacking or it is avoided. Attached are the instructions issued to benevolent coadjutors in the work of medical assistance for natives — the missions of various denominations[1].

Coloured personnel. — In the Belgian Congo there used to be a School for Male Nurses, which turned out assistants imbued with a sense of their own importance and usually incapable. Since then the medical officers have always trained their own assistants and at the laboratory of Leopoldville in particular coloured assistants have regularly used the microscope for many years for certain current diagnoses.

Inspired by what has been done in many of the English, French and Dutch (since 1842) colonies, schools for native medical assistants have been founded in the Belgian Congo. A course of study lasts three years. Students *should* be drawn from those knowing how to read (it is not possible yet to impose in the Belgian Congo preliminary studies equivalent to those of the *lycées).* Instruction *should* also be given in the vernacular but is actually given in French, at any rate at present. The special native languages applicable to each region are taught in these schools.

I have sent to the Committee the prospectus drawn up by Dr. DAVID for these schools which were founded in 1921. One of these schools is working well and one may see there, besides the future native medical assistants who will be at the service of the colony or of private Europeans, native sanitary assistants — sons of chiefs or of notables. These will settle in their villages and will, the founders of these establishments trust, become valuable propagators of civilisation and destroyers of the activities of the witch doctors. These sanitary agents will from time to time undergo courses in the hospitals at large centres to refresh and strengthen their knowledge of ordinary medicine.

It is not my intention to discuss here the training of the white or black auxiliary personnel the programme of whose activities has no direct bearing on the campaign against sleeping-sickness.

(e) Administrative Measures.

The regulations in force for combating sleeping sickness in the Belgian Congo are contained in several Ordinances and Decrees, the latest being that of July 8th 1920.

They may with advantage be given here, translated into English in a somewhat abridged form, as follows :

Medical Passports.

Article 1. Anyone travelling more than 30 miles from his home must be furnished with a medical passport. A passport is obligatory in the case of anyone wishing at any time to pass from an infected to an uninfected district, no matter how short the journey may be. All natives entering the Colony must have the equivalent of a passport.

[1] A useful and comprehensive *vade-mecum,* too large to be included here.

Art. 2. Passports are issued free of charge. So far as possible, adult natives are furnished with passports only when they can produce certificates of identity. When the traveller wishes to pass from an infected to a clean district his passport must be vised every three months by some medical authority. Passports are strictly personal, not transferable, and must always be in the possession of the person to whom they apply. An infected person or suspected person will be refused a passport.

Treatment of Cases of Trypanosomiasis.

Art. 3. Suspected cases may be detained under observation for a period not exceeding one month.

Art. 4. Anyone, irrespective of nationality, race or sex, proved to be infected, must submit to trypanocidal treatment. No infected person may receive permission to travel without having submitted to such treatment as the medical authorities may consider satisfactory, such treatment to be administered at places indicated by the medical authority. On the conclusion of the course of treatment the sick person will receive a provisional medical certificate good for six months from the date of his discharge. This certificate will contain particulars of the said treatment. After six months the person must report at the medical station indicated on his certificate. Persons under treatment or observation may, if they so desire, be employed and will be remunerated for their work. Natives of the Belgian Congo, employed by the Government or by private persons, who at the time of their disbandment are found to be infected, cannot be repatriated unless they come from infected areas. Infected persons who have come from non-infected areas cannot be repatriated but must remain in the area where the diagnosis was established or in some other infected district. These without means of livelihood will be accommodated in government hospitals or quarantine stations. Everyone in the late stages of the disease will be isolated in a hospital or quarantine station.

Art. 5. Natives in government employ found infected with trypanosomiasis may be discharged and, if necessary, repatriated upon medical recommendation.

Art. 6. Refers to forms to be used.

Art. 7. The medical authorities are empowered to examine any person infected or suspected of infection. They may enter habitations, camps, yards, boats or ships of all kinds, and in general any place to examine the people to see if they are attacked by the malady or suspected of being infected. Nevertheless, the medical officers of the Colony alone have the right to enter European establishments and then only when a summons to submit to medical examination has not been complied with within a period fixed by the medical officer.

Persons leaving the Colony.

Art. 8. Everyone, no matter of what nationality, race or sex, who has lived in the Belgian Congo and is leaving the Colony for any reason whatsoever, is obliged to submit to medical examination especially with a view to the detection of trypanosomiasis. Details are given regarding the examination stations. For the Lower Congo these are Leopoldville, Kinshasha, Metadi and Boma. Elsewhere the Vice-Governors have authority to fix stations and posts in the territories under their administration.

Art. 9. Medical officers examining persons under Article 8 will deliver to each person examined a certificate as to the existence of infection by trypanosomes or otherwise. When a person is found to be infected he will receive a sterilising inoculation before departure. A note of this will be entered on the certificate supplied by the medical examiner.

Art. 10. The above examinations and any prophylactic inoculations resulting therefrom are made free of charge.

Census of Persons suffering from Trypanosomiasis.

Art. 11. In addition to the obligation above mentioned, every coloured person no matter of what nationality or sex, is, when required either by a personal notice or a general notice addressed to his principal, bound to present himself for examination for trypanosomiasis before a medical authority. Such notices may be given verbally.

Art. 12. The places chosen for such examinations will be so situated that those attending do not have to travel a distance greater than 50 kilometres in their own chieftancy and 25 kilometres beyond their chieftancy.

Art. 13. Those having the right to issue directly either personal or general notices for census of cases of trypanosomiasis are :

i. Medical officers of the Colony.

ii. Territorial administrators and all other officials of territorial service of superior rank to them, also the magistrates.

iii. Any other medical authority, pharmacists, " infirmières " and sanitary agents to whom special authority has been delegated by vice-governor-generals.

Art. 14. Written notices requiring attendance for examination will be according to the prescribed form.

Art. 15. Any native or coloured person who neglects to comply with a notice may be compelled to come before the medical authority and is liable to certain penalties for his default.

Art. 16. Any native or coloured person served with a notice has the right to have the results of the examination entered upon his medical passport or his identity certificate when he is entitled to have these in his possession. In those cases in which he is not furnished with an identity certificate he will receive a sanitary disc or counter bearing the date and the signature of the examiner or the seal in use in the Health Service.

Art. 17. After the conclusion of a trypanosome census in a chieftancy or amongst a similar body of people, anyone found in the area without a medical passport or certificate of examination is liable to certain penalties unless he can prove that he was not required to attend the summons or has lost the required document.

Art. 18. Personal summonses must be delivered by hand to the individual concerned, by messengers detailed by the authority issuing them. General summonses will be published by posters or proclamation in the native chieftaincies (they will eventually be sent by hand to native chiefs and sub-chiefs who will make them known within their administrative areas).

Art. 19. Those on the trypanosome census return who are infected are required to undergo out-patient treatment or be admitted to hospital according to circumstances.

Clearing of Bush, etc.

Art. 20. The following places require clearing : banks of water-courses, lakes and lagoons, the immediate surroundings of European establishments, native villages and plantations, washing-places, water-intakes, fords, water-crossing places, mooring places and calling places of boats, bridges, points where cattle are watered, sites of fishermen's huts, places where native salt is prepared amongst aquatic plants, sheltering places o

tsetse flies. The clearing of undergrowth consists in making a bank bare for 50 metres depth above high-water mark over a distance of at least 1 kilometre above and below the point to be protected. High grass should be cut, bush and young trees felled. Trees more than 5 metres high may be preserved, provided they are at least 15 metres distant from others in every direction, and are stripped of branches up to 4 metres above the ground.

The grass, bush and felled wood should be collected outside the denuded area and burned on the spot after they are dry.

If the stream is less than 500 metres broad, the opposite bank, if not occupied, should also be cleared. Clearing should be done over a large space under direction of the District Commissioner on the recommendation of the medical authorities. The work of clearing should be done by the occupants of the land or, in their default, by the landowner. Defaulters are required, moreover, to pay the cost of clearing of which notice (even verbal) has been given by the authorities.

Art. 21. Every European establishment which is not situated on a river, lake or lagoon is required to effect such clearing as may be decided upon by the territorial authority upon medical recommendation. Native villages similarly situated may be required to effect clearing over a larger area than that fixed by the order of native chieftaincies. Such obligation will be carried out as above noted.

Navigation, Fishing, Travelling or Camping in the proximity of Glossina-infested Waters.

Art. 22. Fishing on those rivers and lakes notified by the District Commissioner as infested by glossinae can only be carried on under a permit given by the medical authority residing in the territory to which those requiring the licence belong ; or, in the absence of a medical authority, the territorial administrator will issue the permit.

An octroi duty is charged for the permit. A permit will only be granted to persons free of trypanosomiasis and is only valid for the area for which it is granted. It is subject to such conditions as may be considered necessary by the issuing authority and will specifically state that fishing is only permissible over a prescribed section and at specified hours. The boats from which fishing under licence is permissible will be numbered and marked. Holders of fishing permits are required to present themselves for examination by the medical authority or the territorial administrator at least once every two months. The permit holds good for one year and may always be withdrawn by competent authority if the holder is diagnosed as suffering from sleeping-sickness.

Art. 23. The waters quoted in the above Article 22 may not be crossed at places prohibited by the territorial authorities. It is forbidden to camp nearer to their banks than 500 metres.

Regions infected with Sleeping-Sickness and Regions free of the Disease. Posts of Observation.

Art. 24. District Commissioners will divide their administrative districts into infected and non-infected zones. The division will be announced by posters according to the Decree of January 16th, 1886 and by proclamation in native chieftaincies or by any other satisfactory means. The declaration comes into effect the day of posting. District Commissioners will alter the divisions of the areas according to the extension or the diminution of the disease from time to time.

Art. 25. Persons coming from an infected area and desiring to enter a non-infected area must, before doing so, obtain a medical passport from the head of the observation

post established at the boundary of the clean area or have their passports vised by this official, no matter what may be the date of issue or last time of being vised. Leaders of caravans are responsible for the above detailed instruction as regards the persons comprising their party and are liable to the same penalities.

Art. 26. The persons mentioned in the preceding articles are required to pass through the observation post of the Colony in following the route laid down by the Territorial Authority under Art. 29.

Leaders of caravans are required to notify to the competent authority any infringements of the above rule by carriers of their party.

Art. 27. Observation posts are made, their positions changed or abolished by District Commissioners on medical recommendation ; they are notified to the public by posters.

Art. 28. Heads of observation posts are required to :

(1) Supply or endorse medical passports after careful examination of travellers passing through their posts ; detain suspects or those diagnosed as suffering from trypanosomiasis and to rend them ultimately, if in the third stage of the disease, to the quarantine station of the district, or, if the diagnosis is not conclusive, place them under the care of the medical officer of the nearest infected area.

(2) Supervise the strict execution of hygienic measures in the neighbourhood of their posts.

Art. 29. In a zone of 30 kilometres beyond a non-infected area the District Commissioners (under the advice of the medical authority) will determine the routes to be followed in the passage from an infected to a clean area. For routes common to many districts the District Commissioners will agree upon the route most suitable for general use. This decision will be published. Leaders of caravans are required to ascertain that these directions are observed and to notify infringements to the competent authority.

Crossing of Frontiers.

Art. 30. Entry into the territories of the Districts of the Lower Uele, the Upper Uele, of the Ituri and of Kivu is forbidden to natives living in the colonies adjacent to these regions.

This prohibition may, however, be cancelled by the Vice-Governor General of the Eastern Province who may permit entry to these areas or any one of them under conditions which he considers suitable for preventing the spread of sleeping-sickness.

Entry into other districts on the frontier will also be governed by conditions which will eventually be decided by the Vice-Governor-Generals of the provinces concerned.

Sites of New Villages, Various Posts, Market-Places, Halting-Places, Wood Depots, Stables and Cattle-Sheds.

Art. 31. The site of new villages, market-places, halting-places, etc., should always be at least one kilometre distant from all water-courses, lakes or marshes, the banks of which have not been cleared. Stables and cattle-sheds should, as far as possible, be situated outside collections of dwellings at a distance to be determined by the territorial chiefs in agreement with the medical service. In places frequented by glossinae, owners of large or small cattle, pigs, horses, asses or mules are forbiddden to allow the animals nearer to habitations than 500 metres.

Art. 32. The cutting and sale of wood for steamers will take place in the forest itself well away from the banks of water-courses. Transport of wood to the rivers should only take place after sunset. The habitations of wood-cutters should be situated as far as possible from river-banks towards the further end of the area where trees are felled. All existing posts which from their situation cannot be rendered safe by clearing will be entirely abolished.

Special Regulations for Transport Undertakings and for Establishments situated in Infected Areas.

Art. 33. Wherever the necessity is recognised by the Territorial Authority contractors of transport by rail, boat or other means are required to clear land in zones (which will be indicated by simple notice given by the Territorial Authority under medical recommendation) adjacent to stations, embarkation and disembarkation points, and in general any place involving the presence of travellers or personnel of any business undertaking.

Art. 34. By recommendation of the Territorial Authority passenger carriages and wagons for cattle and other beasts circulating in infected regions will be so designed and constructed as to be fly-proof. Doors will always be kept closed and other openings adequately screened with metal mesh.

Art. 35. Every European establishment situated where glossinae are known to occur is required to undertake such clearing as may be indicated by the Territorial Authority upon medical recommendation.

General Regulations.

Art. 36. Medical Authority includes for the purposes of this Ordinance :

(1) Medical men and pharmacists of the Colony.

(2) Heads of observation posts and sanitary agents.

(3) Approved medical men, missionaries holding the diplomas of the School of Tropical Medicine, Brussels, who have been through a course at the Leopoldville Laboratory, nurses and any other person designated by Decree of the Vice-Governor-General.

Most of the remainder of this Ordinance is concerned with penalties for infringements. These, according to Art. 37, are a maximum of seven days' penal servitude and fines to a maximum of 200 francs. Various offences against the Act are listed.

A few recent supplementary papers may with advantage be quoted.

(f) Thus SCHWETZ deals with the disease in North Katanga as seen by him from 1913 to 1918 in the district between the rivers Lubilash-Sankuru and Lualaba-Congo. The ravages of the malady were very great in 1905-07, but by 1913 an improvement had set in and the epidemic had begun to decline. *G. palpalis* is the principal cause but the statement is made that tsetse alone cannot explain the course of the epidemic. The same author gives an account of his work in the Moyen-Kwilu district from 1918 onwards.

During the four months October 1918 to January 1919 he visited 142 villages and examined 19,378 natives. The people are said to be backward and miserable as compared with those of North Katanga. Tsetse flies were rare and *G. palpalis* had the peculiar distribution mentioned on p. 73.

The disease was probably introduced some ten or fifteen years ago. It is now very unequally distributed. The percentage of population infected in the two regions of

Gobari and Kwilu is given as 8.5. In 1914-15 it was stated by DAVID to be between 20 and 30, so that apparently the disease is on the decline.

In 1919, SCHWETZ was put in charge of sleeping-sickness operations at Kwango and he reports in 1921 on the state of matters in the Kwilu-Kwango area.

A detailed account of work done in the Kikwit region is given. The population is about 100,000, of which over 73,000 were examined and about 9,000 sick-treated. The subjoined table provides a useful summary :

REGIONS	Number of Villages	Number of Persons examined	Disease	Per cent	Number of Persons treated
1. Right bank Kwilu..... (Dr. David)	239	17,082	2,131	12.–	2,835(?)
2. Triangle Kwilu-Kwengo ... (Dr. Segers)	21	1,371	266	19.4	245
3. South of Kikwit ..... (Dr. Schwetz)	48	8,214	1,325	16.1	1,148
4. Lutshima ..... (Dr. Baumann)	71	14,372	2,022	14.–	1,878
5. West Bas-Kwengo ..... (Dr. de Wolf)	39	3,829	663	17.3	605
6. S. W. of the basin Kwengo (M. Demaret)	203	28,681	2,515	11.4	2,307
Total	621	73,549	8,922	12.1	9,018(?)

(g) DANIEL (1919) gives an account of sleeping-sickness as met with in the remote Ituri district lying to the west of Lake Albert and the Semliki River and to the east of the Stanleyville district. The disease is very prevalent in the eastern part of Ituri but has not been found on the streams draining into the Congo, though tsetse occurs on their banks.

(h) 'S HEEREN (1922) recounts his experiences in the Uele district, of which there are two sections : high and low. He deals only with Bas-Uele. The paper is a long one and the tables are too numerous for insertion here. The author's conclusions and recommendations may, however, with advantage be stated. He says :

> " The observations recorded in the course of this report show that one can strangle sleeping-sickness by therapeutic means. Analogous observations have been made in the French Congo.
>
> " So far as the territories of the Bas-Uele are concerned, the last sleeping-sickness census shows clearly that in those regions where medicinal measures have been continued since 1914, *e.g.* Ibembo, Monga, Yakoma, the disease is in full retrogression ; in those regions where medicinal prophylaxis and medical supervision have been interrupted owing to the war, the disease has progressed.
>
> " In order to strengthen the action of medicinal prophylaxis and to prevent the extension of the disease by movements of carriers of the virus and consequent infection of natives in regions at present free, administrative measures must be intensified.

" The districts of Gwane and Bili should be provisionally closed to commerce.

" The doctors in charge of the prophylactic work should be given limited penal powers, and when they are in charge of hospitals these powers should be further extended. "

(i) Tsetse Flies in Belgian Congo.— The most detailed work on this subject is that by SCHWETZ, who wrote a monograph recording his observations upon these insects in North Katanga. It was published in 1919 and deals with the area which lies between 27° and 24° E. longitude and 8° and 5° S. latitude. It is bounded on the east by the Lualaba and on the west by the Sankuru (Lubilash) and is about 220 miles square. No fewer than eight species of Glossina were encountered. Here, however, it is only necessary to mention a few points with regard to *G. palpalis* and *G. morsitans.*

In the Kwilu district SCHWETZ found *G. palpalis* permanently established in small isolated thickets near or actually in villages, on hills, and sometimes at a considerable distance from any water. The reason for this strange phenomenon is said to be the presence of pigs in the thickets.

G. morsitans is found in the Katanga " orchard bush ". Bush-fires modify temporarily the limits of its area by causing a true transitory migration of the insect.

III. British Territories.

(a) No attempt has hitherto been made to gather together in one report all the facts relating to human trypanosomiasis as it occurs in British possessions. This is much to be regretted, a sa vast literature has accumulated on the subject, some of it of very great importance and some of it by no means readily accessible. Accordingly the Committee has had to undertake rather a formidable task which, however, has been considerably simplified owing to the existence of the sleeping-sickness and tropical diseases bulletins.

In addition to the valuable information contained in these publications, there have been available the annual reports from the various Colonies, Protectorates and Territories administered under the Colonial Office, the annual reports emanating from Southern and Northern Rhodesia, copies of various ordinances, rules and regulations, certain documentary evidence in the shape of official correspondence, the Proceedings of the First International Conference on Sleeping-Sickness (1907), the Minutes of Evidence taken by the Departmental Committee on Sleeping-Sickness (1914) and the report of that Committee, the Proceedings of the Sudan Sleeping-Sickness Commission, the series of reports issued by the Sleeping-Sickness Commission of the Royal Society (1913 and 1919) and various other records of less importance. Information has also been forthcoming from the President of the Sudan Sleeping-Sickness Commission and from Dr J. DERWISH, one of the members of the Commission and a medical officer engaged in work on sleeping-sickness in the Southern Sudan.

In the case of Tanganyika Territory, German records have been studied, as the British occupation had been too recent to permit of much detailed information being collected.

It has been considered advisable, as in the case of tuberculosis, to consider each territory separately, beginning on the West Coast.

(b) Gambia. — There is little to record as regards sleeping-sickness in the Gambia. TODD and WOLBACH, in 1911, in the course of 100 days, examined 12,298 natives of this colony and found trypanosomes in 79 persons. They believed that 0.8 % of the popuation was infected. A few cases, varying from one to seven, are now reported yearly.

Bush-clearing is practised, and in 1917 the cutting of mangrove in the neighbourhood of Bathurst was commenced, as mangrove swamps harbour *G. palpalis*, though the flies do not breed in them.

(c) Sierra Leone. — The disease is unobtrusive in this colony and sporadic cases only have been reported within recent years. In six months of 1905, however, GRATTAN found trypanosomes in the glands of 18 persons, six of whom had never left the colony. In 1913, eight cases came under observation, two of which were possibly infected in Freetown. In this year sleeping-sickness was added to the list of infectious diseases to which Section 32 of the Public Health Ordinance may be applied and which gives powers to arrest and compulsorily detain cases in a contagious diseases hospital.

At the end of 1914 and the beginning of 1915 BLACKLOCK and YORKE, of the Liverpool School of Tropical Medicine, were in Sierra Leone and, as a result of their investigations, certain measures were taken to limit the breeding-places of glossinae.

Their conclusions so far as *Glossina palpalis* is concerned were as follows :

(1) " The breeding-grounds of *Glossina palpalis* are not so strictly limited to the immediate vicinity of water as has hitherto been thought ; they may occur quite independently of fresh water and at least a quarter of a mile from sea water.

(2) " Although *Glossina palpalis* is to be found in considerable numbers in mangrove swamps and may travel in these to a distance of at least half a mile from dry land, the swamps do not constitute a breeding-ground of the fly.

(3) " The pupae of *Glossina palpalis* do not hatch when subjected to daily flotation on sea water.

(4) " The ground around the trunk of oil palms *(Eloeis guineensis)* which have not been stripped of their lower petioles constitutes an excellent breeding-place for *Glossina palpalis.*

(5) " *Glossina palpalis* can breed in localities in which practically the only tree is the oil palm.

(6) " Stripping the oil palm of the lower petioles would suffice to destroy the breeding-ground in such localities. "

On their recommendation, the lower petioles of the oil palms on the Cape Lighthouse Peninsula were stripped off, but this measure had not much effect because the debris was left lying about and the undergrowth was not cut. When, however, this was done there was a marked diminution in the numbers of " fly ", which forsook the peninsula as a breeding-place. A good deal of general clearing has been effected and it has been found better to uproot than merely to cut the elephant grass. The extra labour involved is compensated for by the less frequent appearance of the grass and the growth, in its place, of shorter and more useful kinds.

Report for 1917 states that the clearing had a wonderful effect in diminishing the number of tsetse flies. In the Protectorate (Hinterland), where vast tracts of bush are burned every year, very few fly are seen and trypanosomiasis is almost unknown. Much grubbing has been done on the Cape Peninsula to enable farming operations to be carried out.

Attempts have also been made to space out the native villages, and the natives are encouraged to build on more open sites in out-stations.

Of late years no fresh cases have been reported, and the disease, which is of no great importance here, appears to be well under control.

It should be stated that BLACKLOCK and YORKE found *Trypanosoma gambiense* in the blood of an ox in Sierra Leone, but were unable to form any conclusion as to the extent to which domestic stock may harbour this parasite.

(d) Gold Coast. — Reports show that the disease is well known to the Ashanti, who do not fear it. The disease follows trade routes in the Western Province of Ashanti. Villages far distant from the main roads show a smaller incidence. In 1914, of 39,742 persons examined, 110 (0.2%) were found infected. In this year a recommendation was made that a segregation camp should be established in a fly-free area. The usual preventive methods — clearings round villages and in the neighbourhood of fords and watering-places — are in operation. At Kintampo and Sunyani, according to the 1915 report, patients were screened. There is a note to the effect that tsetse flies have been brought into Accra by train and motor-car. At this time the causative trypanosome was believed to differ in some particulars from *T. gambiense*, was regarded as a separate species and was named *T. nigeriense*, but this opinion is no longer held.

There is no evidence that the disease is on the increase. The mortality is low. The routine clearing has been continued and patients are isolated in fly-proof apartments. It should be noted that a few cases have been found in the Northern Territory.

Much work has been done on the trypanosomiases of animals, both wild and domestic, but this does not appear to have any direct bearing on the sleeping-sickness problem, as *T. gambiense* in this region has only been found in man.

(e) Nigeria. — The conditions appear to be much the same as in the Gold Coast, *i e.* the disease, though long known, especially in the Eket district of Southern Nigeria, is, on the whole, mild and does not cause a heavy mortality. Cases of spontaneous cure apparently occur. MACFIE found trypanosomes in 222 cases in Eket in 1912-13, more than half — 67 % — being in children under 15. Some of the natives in this district assert (1913) that the disease is on the increase and attribute this to the neglect by the present generation of the traditional laws and customs relating to the behaviour of infected persons. So far as Northern Nigeria is concerned, previously unknown centres of the disease have been reported from time to time. The principal vector, at least in Northern Nigeria, is said to be *Glossina tachinoides*. The work of JOHNSON and LLOYD has shown that it is the most prevalent of the tsetse and includes in its range all the palpalis country and also all the rest of the country where there is permanent water and the primary forest has not been farmed out.

G. palpalis is limited to evergreen rain forest type of bush and is especially prevalent east of longitude 9° E. and south of latitude 11° N. It is very localised in other parts and of no great importance.

G. morsitans has a limited range but a wide distribution. It requires a relatively dry climate.

Europeans are sometimes infected (three cases recorded in the report for 1919-21), while as regards the natives there is a note in an earlier record to the effect that people living in the open amongst extensive and regular cultivation are more or less immune. It is the backward bush forest natives who suffer, especially those inhabiting river banks and who only till the soil to a slight extent. Children are frequently affected.

The usual preventive measures are in force, and prior to the war sleeping-sickness camps were established but these have not been continued. The most radical measure is stated to be evacuation of the infected area, and Europeans are being prevented by Government from settling in regions from which it is trying to induce the native to leave. Map B sufficiently indicates the present distribution.

(f) As supplementing the notes regarding the distribution of sleeping-sickness in French and British West Coast Colonies, it seems advisable to direct attention to Map A, which was prepared by ROUBAUD as a result of the work of French and British observers.

Glossinae are connected with certain types of vegetation which themselves are tha result, in general, of climatic effects. One may distinguish in West Africa three great principal botanical zones ; these are (from south to north) :

(a) The great forest belt localised towards the coast-line ;

(b) Forest galleries, which continue (into the heart of the Sudan and Guinea savannas) the forest type of vegetation as galleries or wooded ducts along river banks ; and

(c) The Sahelian or thorny zone characterised by gum acacias and jub-jub trees.

Glossinae, according to the personal observations of the author, have an extension corresponding to *(a)* and *(b)*.

Tsetses are found to be distributed in three principal belts which are superimposed: a southerly band or belt of *G. palpalis*, a median belt of *G. morsitans* and a northerly belt of *G. tachinoides*. Each belt is naturally established from the predominance of the particular species of glossina present which is considered as characteristic, but overlapping occurs, as may be expected. One should add to these belts of dominant species, as regards French West Africa, a zone of *G. longipalpis* which comes in between the *G. palpalis* and the *G. morsitans* zone.

In general terms, West Africa may be considered as tsetse-infested in practically two-thirds of its superficial area. The Sahelian areas, to the north of the rivers Senegal and Niger, only are free. South of these two rivers the only places which may be regarded as fly-free are the thorn-covered savannas of Ferlo and the bend of the Senegal River from a little above its mouth up to Bafoulabé and the Niger from near Koulikoro to Say, with the interior of the bend of this great river.

The flies most limited in geographical area are the Great Forest species, *i.e. G. pallicera* and the large fusca-tabaniformis group, the former especially being confined very strictly to a short distance from the coast-line. On the whole, these different species are included within the limits (marked on the map) of the great virgin forest.

G. palpalis has the widest distribution ; it may be found, in fact, over the whole area from the coast to the extreme limits of the fly belts.

G. tachinoides, the true glossina of the Sudan, is found in much greater quantity than palpalis in all the zone south of the northern limit of the forest-line as far as the eleventh parallel. The western limit of this fly is considered to be 10° longitude west of Paris. This is the normal area, but seasonally and sporadically it is found more to the south.

South of the tachinoides zone *G. longipalpis* covers a belt which extends between latitude 6° and 11° N. In the southern part of this zone the species touches the great forest belt but never penetrates it save for local breaks in the forest line.

The morsitans zone extends more to the north than the longipalpis zone, which may be easily explained by this species having characteristics enabling it to exist in dry areas, yet on the other hand it extends less towards the north than either tachinoides or palpalis. As the latter live exclusively in the vicinity of well-wooded water-courses they suffer less from the effects of drought than morsitans does. As ROUBAUD shows elsewhere, *G. morsitans*, with its less resistant powers to heat than tachinoides, cannot accordingly advance so far to the north ; its most important area covers the whole of the hinterland of Guinea, the Haute-Casamance, the Haute-Gambia and the regions corresponding to the railway from Thiès to Kayes. This zone gives a proof that the previous extension of the fly is continuing. The proof is supplied by the smal

province of Niom-Bato situated between the territories of Saloum and the Gambia. ROUBAUD had already shown (1915) that isolated morsitans areas still observed in this region must originally have been attached to the great morsitans zone of the west.

Any of the zones above described may be variable, depending on the presence or absence of game ; communication by rail, etc. may modify conditions.

(g) Rhodesia: 1. *Southern Territory.*—Human trypanosomiasis has been known to exist in this region since 1912, when a focus of the disease was discovered in the Sebungwe District, the cases occurring in natives on or near the Busi River, a tributary of the Sengwe. Attention was directed to it owing to a European becoming infected. Thereafter ten cases were discovered in natives. Radical measures were taken, the whole native population, numbering about 3,000, being removed from the fly area to fly-free areas. The country was also thrown open to the big-game hunter with a view to eradicate the game and so diminish the spread of the tsetse. At a later date the Sebungwe area was closed for shooting and neighbouring territory thrown open in the hope that the game would take refuge in the former and that observations might be made on the fly.

The results are reported in 1915 as disappointing, as, though the Sebungwe area was officially closed, it had nevertheless been persistently hunted and so the game did not congregate there. It was found, moreover, that indiscriminate shooting simply drives the game out and causes it to spread in various directions, possibly towards occupied farms. Thus there is a considerable danger that this measure will result in a spread of the fly. The fly areas are very scattered and limited in extent so that there is no question of spread to more inhabited districts. Precautionary measures have been taken to guard against the introduction of infected native labourers from North-East Rhodesia. There appears, however, to be little danger in this direction. Indeed, it may be said that sleeping-sickness is by no means a serious problem in Southern Rhodesia. The number of fatal cases amongst Europeans and natives reported yearly is very small. In 1912, only two native deaths were recorded.

2. *Northern Territory.* — The Committee is indebted to the British South Africa Company for access to the official medical reports.

In 1907, cases of human trypanosomiasis due to *T. gambiense* were found by SPILLANE on the Luapula River, Lake Mweru and the south end of Lake Tanganyika. They were all near the northern border of the territory where *G. palpalis* occurs. Preventive measures were taken and 55 cases were collected in a camp By the end of 1908, all the natives concerned were moved inland 15 miles. By 1910, a total of 65 cases had been recognised. The disease would seem now to have died out.

The history of *T. rhodesiense* infection begins with the discovery in July and September 1909 of two infected Europeans who apparently acquired the disease on the Luangwa River. In 1910, 12 cases had occurred, 3 in Europeans, all in areas to the south of *palpalis* regions. In 7 cases the Luangwa River was believed to be the locality where infection occurred. In 1910 STEPHENS and FANTHAM described the trypanosome concerned as a new species and named it *T. rhodesiense.* In March 1912 *G. morsitans* was proved to transmit it.

It appears advisable to summarise the information contained in the annual reports for recent years regarding this form of human trypanosomiasis as this will show what has been occurring and what is being done to combat the disease.

Report for 1913-14. — Ndola. Two native cases diagnosed during the year.

Fort Jameson. One case found in a white settler at Msoro who was badly bitten by *G. morsitans* when elephant-hunting on the Luangwa River. No case amongst natives was found during the year, although the whole of the Chinunda and Rukusi districts

were examined. Considering that some 20,000 persons underwent gland palpation, this negative result is significant.

Kawambwa. Five native cases under supervision in a segregation camp. These had so far recovered that they were allowed to go on parole to their homes, reporting monthly to the medical officer for examination.

Mpika. Three native cases reported.

Fundu. Two native cases reported, with one death.

Kansanshi. One case noted. Apparently infected when attached to the Anglo-Belgian Boundary Commission.

The following summary of sick for the year is given : Broken Hill (1), Ndola (2), Fort Rosebery (10 in camp), Kansanshi (1), Mpika (3), Kawamba (5 in camp), Fort Jameson (2), Fundu (2). — Total 26.

No report was issued for 1914-15 owing to the outbreak of war.

Report for 1915-16. — Very few cases recorded, the most (4) at Fort Jameson.

Report for 1916-17 does not indicate any spread of the disease in the Luangwa area or any marked increase in its incidence. In the Ndola area 500 natives (war carriers) were examined but no cases were discovered amongst them.

Luapula area. Here the disease has practically ceased as a result of depopulation of the infected district.

Livingstone. Two cases admitted and two deaths (native).

Broken Hill. Two native cases admitted.

Fort Jameson. One death (native).

Fort Rosebery. The segregation camp has ceased to exist except in name. It no longer contains any patients.

Report for 1917-18. — Mweru-Luapula area. No further investigations made.

Luangwa area. No further investigations made. Only two cases came under treatment. Nothing to show that the disease is present in epidemic form. It has been known to exist in the Luangwa Valley for the past ten years but there is no evidence of any tendency to spread, even though the conditions appear favourable for its extension. Doubt is thrown on the role of game as reservoirs of pathogenic trypanosomes and it is suggested that man alone is the source of danger. A plea is advanced for the need of further entomological research.

Fort Jameson. Two native cases with two deaths.

Report for 1919-20. — Luano Valley. Examined but no cases found.

Ndola. One case reported, probably infected in the vicinity of Fort Jameson.

Ndola Sub-District. Seven cases found in villages on the lower Luswishi River and its tributaries.

Report for 1920-21. — Luangwa Valley. A survey by KINGHORN confirms the impression of the importance of human reservoirs of infection.

It would seem that about 100 persons died of sleeping-sickness in Kambombo's villages during the wet season of 1919-20. Prior to this time the disease was sporadic and comparatively rare.

Ndola. No further investigation.

Mweru-Luapula area and Lake Tanganyika. No evidence of recurrence of the disease. The statement is made that before allowing natives back into the restricted areas it will be advisable to determine the present infectivity of the fly.

Luangwa Valley. KINGHORN reports that he has now repalpated the natives under the chiefs Tembwe and Kambombo, with the exception of those in the following villages : Katangalika, Pendwe, Zowole, Kapembe and Mwinenkonde. 3,450 natives examined and 16 cases diagnosed (12 in Kambombo's country and 4 in Tembwe's).

Compared with his work in 1920, it seems that there has been an increase in percentage of infection in Kambombo's country (0.59, against 0.73), but the joint percentage remains about the same. The maximum infection in the countries of these two chiefs would appear to be 2.5 per cent per annum. It is considered certain that the human reservoir is now playing a very important role in the maintenance of infection.

Report for 1921-22. — Lake Tanganyika was visited during the year and recommendations (since adopted) made for the repopulation of selected sites on the shore of the lake. It is believed that with the precautions taken this will be a success.

Mweru-Luapula area. It is proposed to recommend for consideration that this area should also be repopulated.

Luangwa Valley. The increase in the disease (above noted) is apparently largely local and more or less confined to the territories of the chiefs Tembwe and Kambombo.

KINGHORN believes that the main focus shows a tendency to shift gradually to the north. From native and other observations it is evident that the fly is steadily encroaching in that direction. The two facts are undoubtedly connected, *i.e.* as the fly spreads, a native population heretofore free from the results of infection is exposed to the disease and the initial outcome is a comparatively large number of cases. As the time passes, the disease assumes a condition of equilibrium and the cases are few in number, as is now the state of affairs in the larger portion of the valley. Occasionally, of course, local recrudescences occur, though nothing certain is known of the conditions which determine them.

During February and March 1922 Chief Chikwa's country was examined. Out of 1,794 natives examined, 4 cases (0.22 per cent) were found.

The German Commission, Dr. KLEINE and FISCHER, arrived in November 1921 and commenced investigations on the value of " Bayer 205 " in Ndombo village in Mpika sub-division of the Luangwa Valley.

Fort Jameson. Two cases reported — one a European.

It is clear that at the present time sleeping-sickness is not a very pressing problem either in Southern or Northern Rhodesia. The measures adopted appear to have been effective.

In addition to what has already been noted, other evidence is forthcoming to show that in N. Rhodesia there is direct transmission of the parasite from man to man. For one thing, the majority of cases, according to MAY, the Principal Medical Officer, occur in the vicinity of the main traffic routes, where, naturally, game is less abundant than in many other localities. For another, there is the retrogression of the disease, although all the conditions favourable to its spread, including plenty of game, are present.

Other examples might easily be given, but the above must suffice. It may, however, be said that, as SWYNNERTON has pointed out, similar evidence exists in the case of the French Sudan, Northern Nigeria and the shores of Lake Victoria[1].

Nyasaland. Several years prior to the outbreak of war — to be precise, in 1908 — sleeping-sickness had been found in this protectorate, the first case being an imported one discovered on the west shore of Lake Nyasa. The Royal Society Commission believed that the disease had not been introduced from Tanganyika but was endemic in Nyasaland. MURRAY, who had been resident in Nyasaland since 1901, stronglydissented from this view and, in a paper which was not published until 1921, states his rea-

[1] A paper by KLEINE on the epidemiology of sleeping-sickness has just appeared in the *Deutshe Medizinische Wochenschrift* for April 20th, 1923. From his experiences in Rhodesia, KLEINE concludes that the form of sleeping-sickness there is the same as that which he has observed in Tanganyika, on the shores of Victoria Nyanza, and in the Belgian Congo. He states that man is the chief reservoir of the disease and that the role played by the wild game has not yet been settled.

sons for believing that there was no sleeping-sickness in Nyasaland prior to 1907-8 and that the disease was introduced about that time from Lake Tanganyika or from Northern Rhodesia, or from both.

The first case in all probability suffered from *T. gambiense* infection and there would appear to be reason to believe that some of the earlier cases also harboured this trypanosome. At a later date, however, the prevailing infection was found to be due to *T. rhodesiense*, with *G. morsitans* as its vector. The question therefore arises: is it possible that, perhaps owing to a change in the fly vector, *T. gambiense* altered in type and exhibited the characters of *T. rhodesiense* ? It is true there is no definite proof in support of such a hypothesis, but this view seems at least worthy of consideration.

Report for 1912 mentions that 62 cases had so far been recorded, and during the year 27 were diagnosed, of which 24 were found in the proclaimed area of the Dowa sub-district Map J. These figures would appear to be wrong, as a table gives the number as 46 for the year 1912.

At this date a segregation camp, laboratory and dispensary had been built on Ngaini Hill. The usual preventive measures instituted in 1910-11 remained in operation. Amongst these may be mentioned the following :

1. Impressing upon the natives the necessity of avoiding being bitten by flies.
2. Clearing for a distance of 300 yards or more round villages situated in close proximity to fly. Extending these clearings in many instances so as to embrace their food gardens also.
3. Making clearings on each side of roads and main paths leading from one village to another, thus uniting groups of villages and enabling the natives to journey from one to another with commensurate safety.
4. Instructing the natives to use this felled timber for firewood, and to avoid visiting the adjacent fly-infested woods for this purpose.
5. Instituting public latrines in all the villages to prevent natives from visiting the adjoining woods for the purpose of defæcation.
6. Prohibition as to the firing of grass till the month of October, when only it is fit for burning, so as to ensure as large and as effectively cleared areas as possible.
7. Removal, whenever feasible, of villages situated in danger zones to fly-free areas.

A census of the adult population in the proclaimed area (Dowa) gave 15,426 inhabitants, and of these 0.3 per cent had died from sleeping-sickness during a period of 15 months.

Villages in or near the endemic centre had 2,932 adult inhabitants, of whom 1.26 per cent had been diagnosed as infected. No extensive depopulation was attempted but certain isolated and heavily infected villages were moved to the hills. None was left in the fly area proper. Extended investigations with mapping of fly areas were made in Western Nyasa, Marimba, Dowa, Dedza, South Nyasa and Upper Shire districts.

It is stated that the only prophylactic measure of value is the removal of infected cases from fly to fly-free areas.

Advice as regards protective measures against tsetse was issued to travelling Europeans.

Report for 1913 records 64 cases notified during the year, making a total of 172 from 1908 onwards. No tendency for the disease to spread, at least to any extent, was

observed, but it would seem that, having established a footing in the Marimba and Dowa districts, it was slowly extending to the south, where relatively few cases have been found. Dr. HEARSEY, the Principal Medical Officer, suggested that this slow rate of spread might be due to :

(a) The rapid course of the disease in man, so that he is incapacitated at an early stage of infection, and, becoming bed-ridden, offers but few opportunities for infecting flies.

(b) Only a small proportion of flies which have fed on an infected case being capable of becoming infective.

(c) The migratory habits of *G. morsitans* and the presence of game in fairly large numbers, so that after having become infective for man it can continue to exist in the blood of mammals other than man.

The theory, interesting in the light of recent discoveries in Tanganyika, was also advanced that possibly the infection was normally communicable mainly from man to man and that this explains why it has not become epidemic.

The conditions in the various districts were carefully tabulated in this report but need not be here transcribed, as they have greatly changed since 1913.

Report for 1914 indicates but little change in the Dowa and Marimba districts. The infectivity of Western Nyasa, Dedza, South Nyasa and Upper Shire was lessening. *G. morsitans* is noted as being much more numerous in the Dowa and Marimba districts. A tendency for both game and fly to spread westwards was observed. The fly area has extended markedly along the Lipimbe River. Muyanja, where several cases were lately found, was quite fly-free two years ago.

Clearing operations round villages and along certain roads were in operation.

Report for 1915. — Up to the end of this year the total number of cases recorded in the Protectorate amounted to 240. A good deal of experimental work, especially as regards the trypanosomes, found in game is recorded.

Report for 1916 speaks of 31 cases being reported, but investigations were confined to the Dowa District. The blood of 117 apparently healthy natives in the proclaimed area was examined but no trypanosomes were found, and the inoculation of monkeys from the blood of these 117 gave negative results.

Report for 1918 states that the serious shortage of staff occasioned by the war had prevented further investigations. A steady annual death rate from sleeping-sickness continues to be recorded from the Dowa and Marimba districts.

Report for 1919 mentions the impossibility of detailing anyone from the depleted staff for special sleeping-sickness duty. Dr. LAMBORN, however, visited the Marimba district. No case presenting clinical features of the disease was found either in the lake-side villages or those two to six miles inland at the edge of a fly area whence most of the cases were reported in 1912-14

Report for 1920. — Investigations still in abeyance. No useful data recorded.

Report for 1921. — The disease is stated to be endemic in the Dowa and Kota-Kota districts. There is possibly a new focus on the Lunjadzi River and its tributaries in the Kasungu district. Interesting observations on natural parasites of the pupae of Glossinae are described, and the possibility of employing them on a large scale against Glossinae is considered. As regards this matter, the Committee would refer to the recent monograph on tsetse flies by AUSTEN and HEGH, in which the question is fully discussed.

Further investigations are obviously required in Nyasaland. There is at present no clear idea as to the extent of sleeping-sickness in the Protectorate and one cannot

gauge its importance. This unsatisfactory state of matters has been fully realised and the services of an expert entomologist have been requisitioned.

As regards the tsetse problem in Nyasaland, it should be noted that SHIRCORErefers to the way in which the fly collect round villages in the forest and on the paths between villages. He says that, for the greater part of the year, the flies are constantly feeding on the villagers, both when the latter are in the villages and also every time when they leave them. Such a state of matters in a sleeping-sickness area would tend to point to a man-borne infection and to eliminate the role of game as intermediate hosts.

(h) Tanganyika Territory. — The war produced so many changes in this region that until there has been time for fresh survey work it will be impossible to gain any correct idea of existing conditions. Numerous German records are available, some of which are listed in the references, but it is doubtful as to how much the information they furnish is now applicable.

A brief résumé may, however, be given for eventual comparison with later findings. In the German time there were known to be three infected areas :

1. Victoria Nyanza region.
2. Lake Tanganyika region.
3. Southern area in the neighbourhood of the Rowuma River and its tributaries.

1. *Victoria Nyanza Region.* — G. *palpalis* found along the greater part of the lake shore and on adjoining islands except on the west side for about 40 miles south of the British border. On the east side the banks of the Mori River were considered to be the chief centre of infection, and police posts were formed on the Mara River to restrict movement. A concentration camp for sleeping-sickness cases was established at Uteji on the right bank of the Mara River, and most of the infected banks of the Mori River had been cleared. Work was also in progress south of the Mara River on the lake shore. The situation was considered well in hand. On the west side and at the south side of the lake a " closed area " was formed, including parts of the mainland bordering on an island in Emin Pacha Gulf. Outside the area clearing operations were in force. The frontier north of Bukoba was closed. Two concentration camps existed in which 700 cases of sleeping-sickness were interned. New cases on Victoria Nyanza were reported as having been reduced from 1,405 in 1908-9 to 27 in 1912-13.

According to SIMPSON'S report (1914), the Germans had three sleeping-sickness camps in the Lake Victoria region : one at Kigerema (near the Uganda frontier), a second near Shirati and the third at Usumbari. He states that a passport system was in operation, certain caravan routes closed and that arrangements for examination of suspected cases were in force at certain stations.

2. *Tanganyika Region.* — *G. palpalis* found on almost the whole of the east shore of the lake and for some distance up the Mlagarasi, Rugufu and Luegera Rivers. It is also well known on the Russissi River.

The Belgian Congo was considered the chief source of infection. By clearing, a few miles of the lake shore, including Kigoma and Ujiji, had been made fly-free and three small areas on the lake shore further south were also cleared and made fly-free. The worst part of the Mlagarasi River had been cleared. Three isolation camps had been formed at Ujiji, Nianza and Usumburu respectively. A return in 1911 gave 1,672 slight and 802 severe cases of sleeping-sickness on Lake Tanganyika. Of the latter, 268 had died. In 1912-13 there were 3,303 cases under treatment.

3. *Southern Area.* — BECK'S expedition in 1911 reported sleeping-sickness endemic on the upper course of the Rovuma River. The infection was traced to Portuguese territory with which there was constant native traffic. BECK stated in 1913 that 50,000 natives had migrated during the past five years from Portuguese territory to settle in the Lind

and Songea Districts. He remarks that *G. morsitans* was widespread. In 1911, 20 cases of sleeping-sickness were found, and in 1912-13, 50 more along the Rovuma River.

Beck made further investigations along the whole extent of the shores of Lake Nyasa from the British border at the Songwe River to the Portuguese border. Only one case was found: at Kwindi. Game in the Songea district was considered a negligible factor.

In 1915, Beck made another expedition and found a centre of infection at Rupunda, on the Likondo River.

4. Newham reported on the occurrence of cases of trypanosomiasis during the East African campaign. Although it had been in progress since 1914, it was not until March 1918 that any case was recorded. This, however, can be explained by the fact that it was not until the troops reached the southern part of German East Africa, in the autumn of 1917, and were close to the Rovuma River that they were fighting in an area definitely known to be infected. As a matter of fact all the cases reported by Newham acquired infection in Portuguese territory and so his paper will be considered later. At the same time he furnishes a few particulars which supplement the above German accounts, and we have here transcribed his remarks :

> " Very little accurate knowledge is available as to exact distribution of the disease in German East Africa, nor has such detailed work been done on the types of Glossina to be met with, or their areas of distribution been properly delimited.
>
> " Before the war the Germans had investigated these points to a limited extent. Thus Dr. Marshall writes in 1908 that there were two foci of sleeping-sickness on Lake Victoria and one on Lake Tanganyika. The disease had also been discovered on the islands Bumbire and Iroba, and on the mainland of Ihangiro, opposite to them. The fly had not been found at the Kagero River, nor on the shore of the lake near its mouth. *Glossina palpalis* was found widely distributed on the shore of the lake and on the rivers in the Shirati district, and sleeping sickness was very prevalent there.
>
> " Cases of the disease had also been found on Ukerewe Island. As for the distribution of *G. palpalis* on the lake, there were only a few points at which the presence of this fly could be excluded.
>
> " The conditions on Lake Tanganyika were worse even than those prevailing on the Shirati coast. The large rivers Malagarasi and Rusisi were fly-haunted. At Urundi the percentage of infection was between sixty and ninety. Of 200 natives examined at Kirando (80 miles north of Bismarckburg), 15 were infected.
>
> " In 1910 Wolf met with a case of trypanosomiasis, which came from the Rovuma River near its junction with the Sassawara River. In 1911 the extraordinary mortality of the natives in this area was reported, and on investigation this was found to be due to trypanosomiasis.
>
> " Following on this discovery, search was made for tsetse, and Wolf reports: 'In spite of every search being made it was not possible to find in any part of Upper Rovuma area the *G. palpalis*. After painstaking searches, it was established that the *G. morsitans* is the transmitter of the Rovuma sleeping-sickness in this area, and that the trypanosome shows characteristic peculiarities from the *Trypanosoma gambiense*. The trypanosoma of the Rovuma is identical with the *T. rhodesiense* discovered about 1909 by English physicians '.
>
> " Professor Beck, as a result of his investigations, stated that 8 to 10 per cent cf the *G. morsitans* in the Rovuma area were infected with trypanosomes.

" Wolf, in his report, further states: 'German doctors who have worked on the Rovuma consider it certain that the principal source of infection is to be sought in the thickly populated districts of the Lugenda Valley, and especially in Kumembe (Ngomano). The Lugenda River flows through the Portuguese Colony in a north-easterly direction to enter the Rovuma near Ngomano. In 1917, five cases of sleeping-sickness were identified in the hinterland of Kilwa on Lake Kiwlimira. Here there are no *G. palpalis*, so that *G. morsitans* must be accepted as the transmitting agent. It agrees likewise to the *T. rhodesiense*. I believe that the sleeping sickness from the Rovuma area or the Portuguese territory has been carried past Liwale'.

" From these few extracts of German writers it would appear that the known infected areas in German East Africa are the southern border of Lake Victoria Nyanza, the vicinity of Lake Tanganyika, and the neighbourhood of the Rovuma River (which forms the boundary between the German and Portuguese Colonies), from Sassawara on the west to Liwale on the east. "

TAUTE, who served with the German forces throughout the campaign, states that the pre-war work of KOCH and KLEINE had made matters easy in the Tanganyika and Russissi regions, as the victims of *T. gambiense* were a constantly diminishing number. In the southern part of the colony, however, new foci were found, where the parasite concerned was *T. rhodesiense*. No indications regarding the position of these foci are given in his paper. The total cases amongst the German troops were one European (who died) and 22 natives. There is no statement as to where they were infected.

5. The post-war records are naturally scanty.

Report for 1918-20 states that no case of either form of sleeping-sickness had been found by the civilian staff.

LAMBORN investigated the Lower Rovuma in December 1918 but found no cases. *G. morsitans* was present but not in large numbers. On the Victoria Nyanza and Lake Tanganyika the precautionary measures taken by the Germans were being continued as far as possible.

Report for 1921 states that no cases of trypanosomiasis had been notified during the year though there was little doubt that the disease still existed. The shores of Victoria Nyanza and Lake Tanganyika are still fly-infested, though the area of distribution of *G. palpalis* has been materially reduced.

G. morsitans occupies the greater proportion of the territory.

G. pallidipes also has a wide distribution, and the probability of this fly being a vector cannot be ignored.

The recommendation is made that at least three medical officers should be appointed for sleeping-sickness work: one each for Victoria Nyanza and Lake Tanganyika and one for the Rovuma areas. It is suggested that after preliminary tsetse work under the Game Warden they should proceed to the above-mentioned districts. The need for a veterinary pathologist, a medical pathologist and an œcological botanist is also emphasised.

It is clear that it will be some time before reliable information is forthcoming as regards the amount and distribution of sleeping-sickness in this large territory. The existing medical staff is quite inadequate to deal with the problem.

6. Quite recently, however, an important discovery has been made which has been the subject of papers by SWYNNERTON, DUKE and AUSTEN. It concerns a fairly extensive outbreak of sleeping-sickness in the Usukuma region, almost due east of Mwanza, at the southern end of Lake Victoria. As Swynnerton states, the first early reliable record of this epidemic came from BALFOUR, who, early in 1918, was shown at Mwanza a blood film from a case of sleeping-sickness which had come from Usmac and had died in Mwanz

The infection was very heavy. The British Headquarters at Dar-es-Salaam was at once informed but, owing to hostilities being still in progress, no action could be taken. It was not until February 1922, when a native headman drew attention to the outbreak, that an investigation was conducted. Duke, however, notes that at the end of 1918 a case with symptoms of sleeping-sickness was sent into Mwanza from the Hormia Sultanate, which lies in the fly-belt. Moreover, natives had clearly recognised the disease by 1920 and had even called it " Malali " — a new name for a new disease which they stated ran a rapid course, usually three to six months. According to Duke, at least 500 deaths had occurred in the fly-belt since the disease was recognised by the natives. The total population of the area concerned is estimated at 16,000, but the number living in close contact with the fly is very much smaller. The first enquiry was carried out by Dr. Maclean, the Medical Officer at Mwanza, who was later joined by the Game Warden, Mr. C. F. M. Swynnerton, an expert entomologist and an authority upon the Glossinae. At a later date, Dr. Duke, of the Uganda Medical Service, also visited the area and collaborated with Dr. Maclean in the investigation.

In certain villages the deaths from *malali* have amounted to 20 per cent, and the figure has been even higher is small hut-clusters situated in the fly-bush.

Dr. DUKE reports that :

" During the tour 539 natives from villages in the fly-scrub were palpated for axiliary glandular enlargement, and, of these, 86 showed suspicious enlargement of the axillary glands on one or both sides. A single fresh blood-preparation was examined from each individual, and 57 of these suspects were examined by gland-puncture. Trypanosomes were detected in 9 natives. In addition, fresh blood-preparations were examined from 77 of the sick assembled at the three collecting stations established by Dr. Maclean. In 37 of these cases, trypanosomes were found in the first twenty fields examined under a one-sixth objective.

" Enquiry among the chiefs revealed the occurrence, in 1919, of a serious famine, which was accompanied by a severe epidemic of influenza. For a year the population of the fly-belt was dependent on supplies from outside, and an extensive relief organisation was necessary. At about the same time the game in the fly-area began, for various reasons, to diminish in numbers, and the fly was consequently obliged to turn to man for food.

" At the time of my visit the fly was feeding extensively on man, and I was led to the conclusion that the trypanosome depends upon direct rather than cyclical transmission for its spread through the population of this fly-area.

" This conclusion received some support from the fact that the presence of numbers of infected human beings in this belt has not resulted in an increase in the percentage of flies showing a gut-and-gland infection over the corresponding figure obtaining for the Masindi *morsitans* area of Uganda, where there has never been any trypanosomiasis among the native inhabitants.

" During the tour 2,206 wild *G. morsitans* were dissected and the following results obtained :

" Percentage containing flagellates	9.3
« of proboscis-and-gut-infections	1.9
« « proboscis only	6.5
« « gut only	0.7
« « gut-and-gland	0.13

" One of these flies showed a double infection — glands, gut and proboscis all being infected.

" The percentage of gut-and-gland infections in 1,562 *G. morsitans* dissected in the Masindi fly-area in 1913-14 was 0.19.

" The spread of the disease through the villages of the belt, in the immediate wake of an infected individual, was most striking.

" In certain instances where it was possible to obtain exact information the interval between the arrival in a village of the first case and the recognition by the natives of symptoms in the second was so short that cyclical transmission could hardly have occurred.

" If the interpretation here advanced of the spread of the disease is correct, it is plain that infected man is a greater menace in the fly-belt than infected game.

" During the tour, a fly-boy and myself were bitten by a fly whose salivary glands were swarming with trypanosomes ; no infection has resulted in either case.

" On a single occasion *T. brucei* was recovered from game : the animal— a waterbuck — was shot in an uninhabited part of the Mbarageti plains.

" Of the three gut-and-gland flies obtained in the course of dissections, two had fed upon clean monkeys and infected them with *T. brucei* and the third was the insect that bit the boy and myself.

" Two strains of trypanosomes from infected natives were brought to the laboratory for investigation. Both these strains develop readily in laboratory-bred *G. palpalis*. The average, maximum, and the minimum periods that elapsed before the flies became infective in these experiments were 21, 26 and 18 days respectively.

" A considerable number of the villages in the actual fly-bush had already been vacated at the time of my visit and their inhabitants removed to clean areas outside ; the existence of extensive open 'mbugas' greatly facilitated the execution of this measure.

" Clearing has also been carried out with a view to joining up these mbugas, and so creating a zone of open flyless country all round the infected area.

" A great deal of valuable clearing could be done by the villagers themselves, without any hardship being entailed, the daily search for firewood, if properly controlled, being a valuable means to this end. "

Dr. Duke speaks of the fly concerned as being of the *G. morsitans* group. Swynnerton, however, recognised that it constituted a distinct species. It has now been described by Austen, who has named it *G. swynnertoni nov. sp.* Swynnerton's report, which deals with the entomological aspects of the outbreak, is of a very thorough and painstaking character. His observations led him to the conclusion that the area covered by the epidemic and which is shown in Map I coincided with remarkable closeness with a section of the fly-belt in which game was markedly scarcer than elsewhere and in which it had been scarcer still earlier in the outbreak.

The fly appeared to be greatly concentrating on man, and this concentration, the result of game destruction, constituted a main factor in the production of the epidemic the other being famine.

Swynnerton believes that the infection in Usukuma, once started, was carried from man to man. As regards its origin, he thinks that, in all probability, it was introduced

from without by the Belgian native soldiery. Indeed, there is a record by Wolf of the capture in this very district by the Germans of three Belgian native soldiers suffering from trypanosomiasis one at least of whom had been treated for the disease in his own country. At the same time, Swynnerton admits that it may yet be clearly shown that *T. rhodesiense* of man is capable of arising from *T. brucei* of the game in places in which the fly has been forced to concentrate on man through the destruction of the game.

We have recorded this interesting outbreak in some detail as it possesses several features of importance and may throw light on certain problems of transmission which yet remain to be solved.

A few additional notes may here be added, as they have a definite bearing on the important questions raised by Duke and Swynnerton.

Taute and Huber, speaking of roadside foci of human trypanosomiasis behind Kilwa and Lindi and further south, state that they were confined to water-holes and river banks which constituted the halting-places for Yao labourers and that cases did not occur in the surrounding country. In one instance at least *G. morsitans* was abundant at and around a water-hole and it would appear that we have here an example of the introduction of man-borne infection into the main human meeting-places on roads on which the fly was concentrating much on man. In the evidence he furnished to the Inter-Departmental Committee on Sleeping Sickness (1913-14) Taute says that the sleeping-sickness areas in German East Africa are as a rule not very rich in game, and he emphasises the fact that *G. morsitans* is a man-fly as well as a game-fly.

7. This seems a suitable place to give the terms of an " Agreement and Protocol between the United Kingdom and Germany with regard to Sleeping Sickness ", which was signed at London on October 27th, 1908.

It may serve as a guide for similar documents in the future, although Article No. 5 no longer has the importance which it was supposed to possess at that date.

Agreement.

" With a view to the more effectual combating of the disease known as sleeping-sickness in the respective British and German possessions in East Africa, His Britannic Majesty's Government and the Imperial German Government have agreed as follows :

" The said Governments will :

" 1. Take such steps as are practicable to prevent natives of their respective territories who are suffering, or are suspected on reasonable grounds to be suffering, from sleeping-sickness, from passing into each other's territories ;

" 2. Take such steps as are practicable in order that all natives coming from the territory of the one Power into that of the other and found on medical examination to be suffering from sleeping-sickness may be detained or segregated in the territory of that Power in which the yare found in the said condition ;

" 3 *a*. Take such steps as are practicable to prevent all natives within their respective territories from crossing from the territory of the one Power into areas in the territory of the other Power which have been declared infected ;

" 3 *b*. Lose no time in notifying to each other the areas so declared infected ;

" 4. So far as local circumstances permit, establish segregation camps in their respective territories at adjacent points on either side of the common boundary for the detention and care of natives suffering, or reasonably suspected of suffering, from or who have been exposed to infection from, sleeping-sickness ;

" 5. Take all such steps as are practicable for the destruction within their respective territories of crocodiles and other migratory animals which may be reasonably suspected of being a source of aliment to the *Glossina palpalis*.

" 6. This Agreement shall come into effect on January 1st, 1909.

" This Agreement is concluded for a term of three years, and it will remain in force automatically for further periods of one year until denounced by one of the parties six months before the expiration of that year. "

(i) Kenya Colony.— The disease has never bulked largely in this territory and seems to be confined to the Nyanza Province. CHERRETT and PUGH, in 1910, diagnosed 97 cases in North Kavirondo and 17 in South Kavirondo. The Principal Medical Officer at that time reported that the disease had been decreasing since 1905 as shown by the increase in huts and in revenue. Of recent years the annual reports merely record the occurrence of a few cases yearly, some imported, some from the country bordering on the Victoria Nyanza, some of uncertain origin.

BEVEN went over the same ground as Cherrett and Pugh between September 1921 and January 1922. He found three foci on the mainland and one on an island and diagnosed 107 cases. According to him, there was evidence that the disease was again increasing.

The latest report available—that for 1920—states that the disease still appears sporadically on the shore of the Kavirondo Gulf. Nine cases were recorded on clinical grounds alone. There was no microscopic confirmation. A proposal was put forward for a survey of the lake-shore areas in 1921 in order to determine the prevalence and distribution of the disease.

(j) Uganda Protectorate[1]. 1. It seems scarcely necessary to trace even briefly the history of the disease in this territory, as the great outbreak which led to the work of CASTELLANI and later of BRUCE and his colleagues has become classical. It is, however, of interest to note what has happened from 1912 onwards, as Uganda is often regarded — doubtless with some justice — as the area *par excellence* where energetic preventive measures have led to a remarkable change in the situation. Yet certain facts brought out by Duke in a paper published in *Parasitology*, 1919, must not be forgotten.

After mentioning that, though the attention of Europeans was drawn to the great epidemic in 1901, sleeping-sickness in an endemic form was known to the Buganda chiefs prior to that date, he states that segregation of the sick was commenced in 1906 and that by the end of 1907 the mainland population had been removed inland for a depth of two miles from the coast. During 1908 similar measures were completed in Busoga and in 1909 in Buvuma and the Sesse Islands.

While the results of these measures appeared to realise the most sanguine hopes, there is reason to believe that the disease, in some measure at least, cured itself by reducing the possible victims in the affected areas. At the same time this factor would not seem to have been a very important one, considering that no less than 21,000 people were removed. No doubt, as HODGES has suggested, the preventive measures were operative to a considerable extent and were aided by the increased knowledge of the disease and its causation amongst the natives, who, in all probability, displayed greater aptitude for taking advantage of such knowledge and were given greater facilities to this end. Such factors were probably more largely operative on the mainland than on the islands.

Duke's table showing what occurred on the Buvuma and Sesse Islands from 1900 to 1914 inclusive is of special interest and significance.

[1] See Map H.

Table showing Deaths returned as by Sleeping-Sickness among the Sesse and Buvuma Islanders, with Estimated Number of Islanders and Deaths per 1,000.

YEAR	BUVUMA ISLANDERS			SESSE ISLANDERS		
	Deaths by sleeping-sickness	Estimated number of islanders.	Indicated number of deaths per thousand.	Deaths by sleeping-sickness.	Estimated number of islanders.	Indicated number of deaths per thousand.
1900.....	5,137	56,322	91	789	23,166	39
1901.....	6,874	51,185	134	1,048	22,377	47
1902.....	19,049	44,311	428	1,950	21,329	91
1903.....	5,174	25,262	205	2,549	19,379	132
1904.....	3,503	20,088	175	2,238	16,830	133
1905.....	2,585	16,585	155	918	14,596	63
1906.....	1,001	14,000	71	718	13,578	52
1907.....	1,314	12,981	99	678	12,960	52
1908.....	667	11,667	55	506	12,282	41
1909[1].....	258	11,000	23	436	11,776	37
1910.....	93	—	8	188	—	16
1911.....	67	—	6	84	—	7
1912.....	25	—	2	11	—	1
1913.....	15	—	1	8	—	1
1914.....	6	—	1	7	—	1

Report for 1912 indicates that the decrease in the disease continues to be highly satisfactory and is believed to be general throughout all the infected areas, *i.e.* Victoria Nyanza, Bunyoro, Nile, Lango, Buganda, Lake Albert, Victoria Nile Jinja Kakindu and Katwe. It is most marked round Lake Victoria and Lake Albert, where the preventive measures have been most thorough. Total admissions 201 (including 115 to sleeping-sickness camp and 86 at various stations).

Deaths 932, as compared with 1,487 in 1911 and 1,546 in 1910.

Of the deaths, Buganda = 82, Busoga = 747, Bunyoro = 84, Ankole = 11, Toro = 5; and there were three others. The deaths in Buganda Kingdom have fallen from 8,003 in 1905 to 82 in 1912.

Under the Sleeping-Sickness Ordinance, a further large tract of country in the Western Province was proclaimed an infected area.

Very few new infections were signalised, but the disease is regarded as being merely held in check. It is not stamped out.

Clearing of jungle to reduce *G. palpalis* is carried out on a large scale, and previously cleared areas are kept well under control.

There is a short but interesting appendix on the administrative measures in force. The following points may be noted, taking the various infected areas *seriatim*.

(1) *Victoria Nyanza :*

(i) Planting of lemon grass in cleared areas near Port Bell.

(ii) A few natives still living in Buvuma Island and an effort to be made to persuade them to move on to the mainland.

(iii) Necessity for a launch insisted upon in order to exercise proper surveillance of the islands.

[1] Year of removal of population,

(2) *Bunyoro.* — In the region of Bugungu natives from the Congo occasionally cross Lake Albert to fish on the Uganda shore. The Belgian Authorities prohibit canoe traffic on the lake and break up canoes when they find them. This surreptitious traffic is difficult to stop.

(3) *Nile :*

(i) A large portion of the country on the north bank of the Victoria Nile was depleted of its population who were removed into fly-free areas. About 4,000 persons were affected.

(ii) By arrangement with the Sudan Government an attempt was made to clear several points on the west bank of the Nile between Roka and Nimule where the steamer and launch pass close to the bank and where fly sometimes come on board.

(4) *Lango.* — Prohibition as regards entering or settling in this area.
(5) *Buganda Lake Albert.* — Control of clandestine visits by natives.
(6) *Victoria Nile Jinja Kakindu.* — Nothing of note.
(7) *Katwe :*

(i) This area increased southwards to Anglo-Congolese boundary on Lake Edward.

(ii) Removal of about 4,000 inhabitants. Natives compensated in salt and exempted from poll tax.

(iii) Canoes destroyed.

(iv) Similar work carried out by the Belgians, this being an important area of salt traffic.

Report for 1913 records further improvement, figures being given. All previous legislation on the subject of sleeping-sickness recodified by the enactment of a new Sleeping-Sickness Ordinance. By this new law infected areas are re-proclaimed and defined and rules drawn up regulating them. Various schedules set forth " Exempted Areas ", " Authorised Ferries and Landing Places ", " Authorised Steamer, Sailing and Ordinary Traffic Routes ", and " Authorised Fishing Areas ".

Two further large tracts in the Eastern and Western Provinces were declared infected areas.

There is a note to the effect that the regulations for the suppression of sleeping-sickness must continue to be enforced and the work of clearing at ports, ferries, etc. maintained for an indefinite period.

Report for 1914 speaks of a further decrease in the number of cases when the whole country is taken into consideration. It is less marked in Busoga and the south-west lake districts and conditions are more or less stationary in the Nile Valley.

Special investigations were delayed or discontinued on account of the war and the West Nile district has not yet been properly surveyed. Unfortunately, supervision and some local measures have had to be relaxed since the outbreak of hostilities.

As a result of investigations, it was decided to repopulate the Soroko Valley — a fly area to the north-west of Mount Elgon. It is a long way from the nearest area[1] where infected flies are found and is separated from it by a wide stretch of fly-free country inhabited by a different native tribe. No cases of sleeping-sickness have ever been found either amongst the natives who inhabit villages bordering the fly-infected part of the area or who hunt in the area.

The following table possesses some interest as showing the magnitude of the clearing operations :

[1] The nearest fly area is that of the Mpologoma, which is 40 to 50 miles away.

Cleared of Undergrowth, Long Grass and Jungle.

	1912	1913	1914
Number of square yards of weeds, grass and vegetation cut and removed — approximately.....	1,543,960	1,570,000	1,570,000
Average frequency of clearance of rank vegetation in same area		Every month	

During the year, the number of in-patients admitted was 25. There were 10 deaths. Of out-patients there were 41 with 10 deaths.

Report for 1915 indicates a great change for the better, the number of cases and deaths having dwindled to an almost negligible figure. The admissions only totalled 6 (1 to the sleeping-sickness camp, 5 to various stations).

Report for 1916 is also of an optimistic nature and records active clearance work, especially at river crossings in the Acholi country and also over a large part of the West Nile and Chua districts.

Taking both in and out-patients together there were only 16 cases, with 7 deaths.

Report for 1917. The admissions during the year totalled 19, with 5 deaths, including 2 deaths at Kyetume Camp. It was decided to reduce the prohibited area around Victoria Nyanza in the Buganda Kingdom only from a two-mile to a one-mile zone, and by the end of the year a great part of this was marked out and the new boundary demarcated. Small areas in the prohibited section on the Entebbe peninsula have also been reopened for occupation by natives. Amongst recommendations for future work is one advocating a complete revision of the Sleeping-Sickness Ordinance in order to obtain adequate powers for dealing with epidemics.

Report for 1918 gives a table of deaths from sleeping-sickness from 1905 onwards. It is here reproduced.

Year	Number of Deaths	Year	Number of Deaths
		Brought forward	27,177
1905	8,003	1912	932
1906	6,522	1913	708
1907	4,175	1914	466
1908	3,662	1915	352
1909	1,782	1916	209
1910	1,546	1917	229
1911	1,487	1918	235
	27,177	14 years total. . . .	30,308

Of these, the Buganda region furnished 20,310 and Busoga 7,481. The first named has, however, shown no deaths since 1917. Practically all supervision of preventive measures has been in abeyance since the outbreak of the war.

The new Sleeping-Sickness Boundary marked out last year has been proclaimed by rules under the Sleeping-Sickness Ordinance, and consequently many square miles of country have been reopened for native occupation.

Report for 1919. The total deaths for the year amounted only to 109. Experimental work on the artificial breeding-grounds for *G. palpalis* introduced by Dr. Hale Carpenter was commenced.

A report by W. F. Fiske, Entomologist to the Medical Department, is included. It deals with the question of the reclamation and sanitation of the "Victoria Nyanza

infected area " and states that the disease is practically, if not completely, extirpated from this area. As, however, it persists in other parts of the Nile basin from which occasional cases are introduced into this territory, it is considered dangerous to permit reoccupation of the proscribed zone under the same conditions that prevailed before and during the epidemic. It is suggested that the Sleeping-Sickness Ordinance should be perpetuated but that the rules framed under it should be relaxed and amended to meet the changed situation. Such amended rules must be strictly enforced.

Details are given showing the difficulties which must be faced in repeopling the islands and the necessity for administrative assistance and transportation facilities.

In the latter connection the following note seems worth quoting in full.

> " A single family will require from 500 to 1,000 banana plants and the equivalent of an acre or more of sweet potatoes and cassava to provide itself with food. Four good banana sets make one porter's load, and a ten-paddle canoe will carry, perhaps, 20 such loads. One acre of sweet potatoes requires about 100 bundles of cuttings, of which a ten-paddle canoe will carry about 25 bundles. The requirements of an average family are therefore at a minimum : six canoe-loads of bananas and four canoe-loads of sweet potatoes and cassava plants, or ten canoe-loads in all. If a ten-paddle canoe is manned by one man from each of 10 famllies, it must make a hundred trips to carry plants for all the families. It requires at least four days to make a return trip between the mainland and any except the nearest islands. Therefore 400 days would be required to transport plants alone, to say nothing of the many trips to carry the food required during the period before the plants can be set and the plantations rendered productive. The canoe must make not less than 25 return trips for each returning family, when only a single return trip was necessary for transport of this family from island to mainland. Then there were more canoes than the population really needed, and at least five times more than can be constructed by the people during the first year — probably ten times more than it will be practicable to construct. These figures are but illustrative of the proportionate magnitude of the difficulties of recolonisation as compared with expatriation."

Report for 1920. The total deaths for the year amounted to 69. Over 10,000 people were examined in the Mpologoma infected area. Undoubtedly large numbers of cases and deaths are occurring and have occurred for years in the neighbourhood of the Nile from Lake Albert to Nimule. *G. palpalis* occurs on almost every river for miles inland.

A long and important report by Mr. Fiske, the entomologist, is included but cannot well be summarised here. It will require consideration in the Committee's final report as, though chiefly of local interest, it deals with some matters having a direct bearing on the prevention of that type of the disease due to *T. gambiense* wherever it may occur.

Report for 1921 records 133 cases (presumably new cases) with 13 deaths, 115 being returned from Mbale, where 10,231 persons were examined. This number includes suspects, only 12 of these being confirmed by microscopical examination and admitted as in-patients. In addition to the 13 deaths, 19 were reported by native chiefs from the five kingdoms, *i.e.* Buganda, Busoga, Bunyoro, Ankole and Toro. The revision of the Sleeping-Sickness Rules is under discussion but it is stated that the difficulty of framing suitable ones that will meet all emergencies and be approved by all parties has been enormous. It is thought that they should be ready in 1922.

The Report of the Senior Medical Officer i/c Sleeping-Sickness for 1920-21 is attached as an appendix to this Annual Report. It is so useful and comprehensive that it has been decided to transcribe it *in toto*. It will be found to give a very clear idea of

the state of matters regarding the disease in Uganda at a comparatively recent date and it is of interest to note that its author got into touch with the Medical Officer in charge of the sleeping-sickness camp at Kajo-Kaji in the Sudan.

2. The following is the text of Dr. Hale Carpenter's report.

Report of Senior Medical Officer i/c Sleeping-Sickness for 1920-21[1].

I. The first necessity on taking up my appointment in September 1920 was to acquire a first-hand knowledge of the conditions in the enormous area for which I became responsible.

Consequently, as soon as affairs could be arranged, I started on safari, visiting first the Katwe Sleeping-Sickness area ; this occupied from October 1920 to January 1921.

In February, the islands Bulago and Kimmi were visited to initiate what it is hoped will be an adequate test of the method of attacking *Glossina* by enticing it to deposit larvæ in artificial breeding-places where the pupæ can subsequently be searched for and destroyed.

From the islands I went to Jinja, and to the Mpologoma Sleeping-Sickness area, of which, and of the Siroko Valley area, a very thorough examination was made. I returned to Entebbe at the end of April.

In June a complete tour of the reoccupied Sese Isles was made to ascertain if any of the repatriates had become infected. At the request of the Reclamation Officer I also visited Buvuma Isle and Grant Bay in order to select safe landing-places for the repopulation of the island.

At the beginning of July, I commenced a safari which lasted five months, examining first the Buamba valley and the Semliki plains, and then the coast of Lake Albert, which was surveyed by canoe between the mouths of the Victoria Nile and the Wasa river. I then went by steamer to Port Liri and made a complete circuit of the East Madi country, followed by a similar tour in West Madi.

A visit was made to the Sleeping-Sickness Camp at Kajo-Kaji in the Sudan and much valuable information gained from the Medical Officer in charge. I next went to Arua and from there to Mutir and along the river to Panyamur, thence back to Entebbe, which was reached in December.

II. *Summary of Work done.*

The main object of the tours has been to ascertain for myself what was the amount of Sleeping-Sickness, whether any parts of the large areas now closed could be opened under permits which could be withdrawn if the conditions imposed were not observed, and whether the boundaries of the closed areas might not be in places safely altered so as to remove from the ban areas now unnecessarily included. The point of view has been that, especially where fishing is concerned, the present regulations are not working well. Natives *will* trespass into forbidden areas to obtain fish ; it seems better therefore to make a virtue of necessity and, by opening certain parts on condition that necessary clearing is kept up, make it possible for the natives legally and in safety to obtain what otherwise they procure surreptitiously and in danger.

A. The Katwe Area.

The route taken was from Fort Portal to Lake George, where preliminary investigations were made, then to Katwe salt lake and the Lubilia river.

I returned to Lake George and spent about 19 days in examining its coasts and islands and then went down the channel to Katunguru and examined the country in

[1] See Map H.

the neighbourhood of the Ankole bank. Then to Kazinga village at the Lake Edward mouth of the channel on the Ankole side, and down the coast of the lake to Kanyamwongo in the Kigezi District. From there the coast was further examined, and a safari made through the uninhabited country in the neighbourhood of the Ntungwe river, whence I returned to Entebbe *via* Mbarara and Masaka.

Miles travelled	590
Number of people examined : Males.	585
Women and children.	641
Total	1,226
(in the neighbourhood of Lake George, the Kazinga channel and north coast of Lake Edward).	
New cases of Sleeping-Sickness found.	3

ACTION TAKEN ON REPORT.

1. A large area on the west coast of Lake George and the island of Irangara opened by permit under certain conditions.

2. A ferry route for salt traffic opened across Lake George from Kasenyi to Mahyoro in Kitagwenda by permit under certain conditions.

3. Katungulu ferry across Kazinga channel given up as the main route for salt from Katwe to Ankole and a safer and shorter route substituted across the Lake Edward mouth of the channel to Kazinga village, which is open by permit under conditions.

4. Extensive clearings done on the banks of Katwe salt lake and the Lubilia river.

5. A watering-place for cattle opened by permit on the north coast of Lake Edward between the Lubilia and Nyamagasani river.

6. The Sleeping-Sickness boundary in the Kigezi District slightly altered so as to free a small area ; but it was thought quite inadvisable to open the Kigezi coast of Lake Edward as desired by the Administration.

B. The Mpologoma Area.

This has long been a difficulty. Although the country within one mile of the water was forbidden, it proved impossible to prevent natives visiting it for fishing and surreptitiously cultivating in old shambas. Consequently, numerous cases of Sleeping-Sickness were reported, and my predecessor, Dr. Marshall, raised again the question of clearing and cultivating the banks on the Budeki side. This has been actually commenced, but lapsed during the war.

Dr. Marshall engaged Mr. Chas. O'Connor to supervise the work, and when I went there I found that most excellent and thorough work had been done and the scheme was most promising ; it is impossible to speak too highly of the value of Mr. O'Connor's services and his patient encouragement and supervision of the natives. Approximately fifty miles of the coast have been put under cultivation for a distance of about 200 yards back from the water, which has necessitated clearing forest and bush of the densest and thorniest character.

The route taken was from Jinja to the Namwiwa-Buseta ferry and then southwards along the Busoga shore of the Mpologoma across the Luamboga river to Busia, the neighbourhood of which was examined, and a visit paid to Mjanji port ; from Busia to Teba's, whence the Busitema country lying south of the Malawa river was examined and cases of Sleeping-Sickness found

Thence I proceeded up the Bukedi shore of the Mpologoma and round the whole of the Namatala swamp up to the northern boundary of the Sleeping-Sickness area.

Miles travelled	500
Number of people examined : Busoga—Men. . . .	571
Women .	845
Children .	677
Total.	2,093
Bukedi—Men. . . .	3,467
Women. .	6,145
Children .	5,301
Total	14,913
New cases of Sleeping-Sickness found :	
Busoga	Nil
Bukedi	5

As a result of the tour the whole of the shores of the Namatala area of the Mpologoma, and large areas on the Bukedi shore of the Mpologoma were opened by permit on condition that the clearing and cultivation so well initiated under Mr. O'Connor's supervision were kept up. Subsequently the people responsible for certain parts, in particular the neighbourhood of Terinyi ferry, have found themselves unable to continue the keeping-up of the clearing, so that certain permits have been withdrawn. It is confidently expected that these measures will greatly reduce the risk of Sleeping-Sickness and also result in a supply of food from the neighbourhood of the water during times of drought when other crops fail. Moreover, it is now possible for natives to obtain fish legally and without risk.

This reclamation work has been greatly helped by the map (scale one inch to the mile) very carefully drawn by Mr. O'Connor from his own survey.

C. The Siroko Valley Area.

This area is inhabited, since the *palpalis* present there has never been proved infected.

Since examination of 1,027 persons (males 256, women 429, children 342) failed to reveal any cases of Sleeping-Sickness, it is presumed that the conditions now obtaining require no alteration.

D. The Toro Sleeping-Sickness Area.

Route taken. The Buamba valley was entered at Buyayu, below Musandama camp on Ruwenzori. I then proceeded down the valley past Buranga hot springs to Bweramule ford over the Semliki and followed the Semliki down to a point about 15 miles above its mouth ; I then struck eastwards across the plains and the Wasa river to Ntoroko.

Miles travelled	125
Number of people examined :	
Endeavours to collect natives for examination failed as the chiefs said that the people would not come. Only sixty were examined at Buranga.	

Action taken on Report.

The very large Sleeping-Sickness area containing much open country quite free from *Glossina* has been greatly diminished. The Buamba forest and the neighbourhood of the Waki river must still be closed, but the Buranga springs in the closed area are open by permit under certain conditions.

The whole of the open plain of Butuku between the Semliki and the Wasa rivers has been removed from the ban.

E. The Coast of Lake Albert.

The whole coast between the mouths of the Victoria Nile and the Wasa river has been closely examined by canoe safari and from the " Baker ", but not all on one safari. Particular attention was paid to the suggestion that Bulinda bay was a better port than Ntoroko, but it was found to be objectionable from a medical standpoint.

Miles travelled in canoe or on foot 125

The whole coast of Bugungu has been thrown open for fishing, and part of it, north of the Waiga river, is opened for habitation for a space of five miles back from the coast. The Sleeping-Sickness boundary which cuts through Kibero has been moved about a mile to the southwards to open a bigger area in the neighbourhood of the village.

Parts of Kyso and Tonia and the whole of Buhuka were opened by permits for fishing and occupation. A total area of about 50 miles of the coast has been opened for fishing.

F. The Waki River Area was examined and representations made to the District Commissioner that certain encroachments had been made.

Number of people examined :

I found one case of Sleeping-Sickness among 68 local inhabitants and 129 labourers at the brickworks. The District Medical Officer, Masindi, arranged for a general round-up of the people near the Waki and found no cases among 459.

G. The Madi and West Nile Districts.

Route taken. A complete circuit was made of East Madi from Port Liri to Patchara, and of West Madi from Laropi to Dufile *via* Amua, Moyo and Metuli, and thence to Gimarra ; from Gimarra to Arua and along the Nile to Panyamur.

Miles travelled. 410

NUMBER OF PEOPLE EXAMINED

	Men	Women	Children	Total
East Madi	2,474	2,529	3,957	8,960
West Madi	3,554	4,242	7,604	15,400
West Nile	2,389	3,420	3,384	9,193
TOTAL	8,417	10,191	14,945	33,553

Number of cases of Sleeping-Sickness found :

East Madi : 118 = 1.3 % (at certain localities 4% of the population were infected)
West Madi : 124 = .08%
West Nile : 13 = .01%

ACTION TAKEN ON REPORT.

A large area in East Madi is being evacuated and the people moved nearer the Nile. The area concerned lies South-West of Boroli as far as Oyuwi and Eranga, and embraces Palaro, the road through which into Gulu must be closed. The main route from Gulu should be the Northern one *via* Zaipi where the new headquarters for East Madi should be.

In West Madi, the Aiyu valley on the frontier is to be evacuated and the people concentrated to the east of Metuli ; Moyo to be the headquarters.

The Madi district to be maintained as a strictly closed area.

In the West Nile district all roads where they cross streams to be protected by clearing for 100 yards above and below.

An inspector to be stationed at Panyamur to prevent infected persons leaving the district to work elsewhere.

H. The Islands of Lake Victoria.

In June, three-quarters of the population reinstated on the Sese Isles were examined and found free of Sleeping-Sickness. The total number examined was about 1,600.

SUMMARY

Total distance travelled (exclusive of journeys in motor vans, railways and steamers). . . . . about	1,750 miles.
Total number of people examined	54,600
Total number of Sleeping-Sickness cases found (255 of which are in Madi and West Nile district).	264

III. Future Work.

It is my intention in January to commence a safari for the thorough examination of the Gulu and Chua districts, which have not as yet been reported upon in their entirety; the situation in Gulu appears to call for action on a large scale as in Madi, and probably it will be necessary to evacuate some places so that by concentration of the people other areas may be made safe by clearing.

The Bunyoro Sleeping-Sickness area has not been fully examined, and I propose to deal with this after Gulu. In it is the Budongo forest, around which the Chief Forestry Officer is anxious to allow his labourers to settle and cultivate. Until I have examined the area it is impossible to say whether settlements can be made with safety.

The District Commissioner, Masindi, is anxious to open a route from Masindi to Foweira, and the Superintendent of Marine, Namasagali, is anxious to cut fuel at Foweira. These questions and the proposed port at Kamdini all call for attention in the coming year.

The closed area on each side of the Victoria Nile between Jinja and Namasagali has not yet been examined, but no questions have arisen concerning this area.

IV. Recommendations.

At the present moment the lake area is not under the control of the Senior Medical Officer, Sleeping-Sickness, but he is concerned with all other Sleeping-Sickness areas.

The Madi district is the most pressing concern at the moment, and the work there is quite beyond the powers of the District Medical Officer, Gulu, or Arua.

It was found necessary in the Sudan, at Kajo-Kaji, close to the Uganda frontier, and in the Yei district, to appoint special Medical Officers for Sleeping-Sickness work only, who are in charge of camps for segregation and treatment. These camps, however, necessitate prolonged residence, for the treatment which has there been found by experience to be the best requires 2 ½ years, and it is very doubtful whether the Madi, and especially the Alur of West Nile, could be kept in the camps by anything short of an armed guard.

The treatment by salvarsanised serum or modifications thereof seems eminently suitable, as each case only requires about 48 hours detention and is then free to return to his home. As regards the danger of an infected person being at large, the present experience seems to show that after this treatment the peripheral blood is so quickly sterilised that the danger of infecting *Glossina* may be regarded as negligible.

I would therefore press the application of this treatment as the most suited to the conditions.

It is absolutely essential in order to combat the Sleeping-Sickness in Madi that a special Medical Officer be given me for this work alone. Every person in the district should be examined quarterly, as is done in the Kajo-Kaji and Yei districts in the Sudan, and since every stream is fly infested a white inspector is necessary to supervise the clearings, which must be wide-spread.

Only by these means can the grave condition now obtaining be remedied.

It must ever be borne in mind that in the Madi district *Glossina morsitans* has been actually caught in an area infected with Sleeping-Sickness together with *Glossina palpalis* and even at the same spot on the same stream.

The risk is great that a *morsitans* may one day pick up *Trypanosomes* from a person infected with *gambiense* which may be able to establish themselves in *morsitans* as the form *rhodesiense*. From evidence recently published (October 1921) this appears to have been the case in Nyasaland.

Should *mortisans* become so infected in Uganda the prospect would indeed be appalling for the Protectorate.

New Rules and Regulations.

For some years past revised regulations have been needed, but it was felt that I should become more familiar with the conditions obtaining in Uganda generally before attempting the difficult task of combining in one the suggestions carefully thought out by Mr. Fiske for Lake Victoria and others more suited to the rest of infected areas.

It has been an extremely laborious and difficult task for all concerned, and one requiring frequent consultation and discussion with Mr. Fiske, Mr. Mackenzie, and other administrative officers, but it is hoped that the Sleeping-Sickness Rules of 1922 will prove more practical than the old ones. They are based on one of many drafts by Mr. Fiske and in many ways are less stringent than the old rules but in some ways more so.

For their successful use the heartiest co-operation of the Administration is essential; it is hoped that officers may be definitely set apart for Sleeping-Sickness duties and I venture to suggest that one would find enough to occupy him in looking after the areas on Lake Albert and the other lakes to the south, and that another is required for the Nile and the districts on each side, while the District Commissioner, Bukedi, will probably find that the Mpologoma area will require a whole-time Sleeping-Sickness Officer.

G. D. HALE CARPENTER, M.B.E., M.D., F.L.S.,

December 31st, 1921. *Senior Medical Officer, Sleeping-Sickness.*

Commenting on the recommendation in the above report, the Principal Medical Officer states that arrangements are being made to test the value of the treatment mentioned, and that the appointment of a European Sleeping-Sickness Inspector for the Northern Province has been sanctioned for 1922. He also points out that a second Medical Officer for the Victoria Lake area is essential now that sleeping-sickness has recurred to a somewhat alarming extent in North Kavirondo.

3. *Annual Report for* 1922 is not yet available, but the Report of the Bacteriological Department for that year has been published. There is a note on a visit to Mjanji and Mbale, the only area of the shore line of Lake Victoria from which the population has never been removed from contact with the fly.

About 90 per cent of fishermen were found to have axillary gland enlargement During the visit 40 to 50 fishermen were seen, several of whom had soft glands which

on puncture yielded trypanosomes. Their general health appeared good and it would seem that the strain of trypanosome here is not very virulent. The heavily infected shore-line between Mjanji and the Sao River, where most of the fishermen were probably infected, has been cleared and they are limited by their licences to certain localities in the neighbourhood of Mjanji.

During the year, about 9,000 persons have returned to the Sese and Buvuma Islands. It is thought that fresh cases of sleeping-sickness will occur. Early recognition of such is most important. As it is impossible to examine all repatriates it was decided to concentrate on fishermen, licensed to fish in the reopened areas. Every fisherman is examined, restricted to certain fishing grounds and must present himself before the Medical Officer every six months to have his licence endorsed.

Records are made on the licences, which are in duplicate, the fishermen retaining the original and endorsements.

The system of marking suggested is :

— = No palpable glands.
x = All glands up to size of dried pea.
xx = Hard glands from dry pea to ordinary green pea in size.
xxx = Soft glands, the size of xx glands and all larger.

Information on duplicate licence is transcribed at the laboratory on to cards which are grouped according to fishing grounds. Up to date the records of 3,968 fishermen exist.

So far no cases of human trypansomiasis have been reported from the reclaimed areas of the Buganda Kingdom, which includes the Sese Islands. A case was found on Buvuma Island but infection was undoubtedly acquired in the Busoga endemic area, not on the island.

The country bordering the Mpologoma River and its tributaries is at present heavily infected but to what extent has not yet been fully decided. As there are Buvuma natives scattered through the country it is difficult to prevent infected persons from reaching Buvuma.

(k) Anglo-Egyptian Sudan. — 1. Official reports dealing with sleeping-sickness in this country and to which the Committee has had access do not go further back than 1918, in which year the Sudan Sleeping-Sickness Commission was abolished, its duties being taken over by the Central Sanitary Board, Sudan Government, the President of which is the Director of the Medical Department, Sudan Government. Before considering the annual reports in detail, a brief résumé may be given of the history of the disease in the Southern Sudan, the only part of the territory in which it occurs. Here two separate provinces must be considered : (i) the Bahr-el-Ghazal, (ii) Mongalla Province. The latter in its western portion includes what was previously the Lado Enclave of the Belgian Congo and which was taken over by the Sudan Government in June 1910.

α. Bahr-el-Ghazal. — So far as can be told, the first cases to be reported in the Bahr-el-Ghazal proper were found at Raga near the French Congo frontier in 1909. These cases had come from the French Congo and it is very probable that there had been other infected immigrants who had died after reaching the Bahr-el-Ghazal. Quarantine camps were at once established in Raga and further south at Dem Zubeir. Extensive clearing operations were also undertaken.

Prior, however, to 1909, cases had been recognised in the southern Bahr-el-Ghazal, at posts still occupied by the Belgians though outside the Lado Enclave.

The following short history of sleeping-sickness in the Bahr-el-Ghazal is given by Captain B. H. H. SPENCE in the Annual Report for 1918.

" In 1904 the danger of Sleeping-Sickness entering the Sudan from the French Congo and the Belgian Congo was first realised. The first case recorded in what is now Sudan territory is that of the native wife of a Belgian official at Meridi in April 1907. In May 1907 El Bimbashi H. Ensor saw a case at Ganzio, close to Meridi ; this woman was the wife of a Belgian soldier and had come from Yei. Cases had also been found at Ngindu in Yambio District and Madebe between Meridi and Yambio. These and other posts were evacuated by the Belgians in June 1907.

" In October 1909, El Kaimakam F. F. Carroll Bey reported the first case of Sleeping-Sickness in the Western Bahr-el-Ghazal at Raga ; the man was an immigrant from the French Congo, six of his companions had already died and the seventh was reported to be very ill in Dar Rizeigat, sleeping excessively.

" In June 1910, two cases were found in Dem Zubeir ; they had been in the Sudan over a year.

" In May 1912, an infected soldier was found at Meridi ; he had left Kapei, was then living on the Torei River and was heavily infected in August 1907 and had never been in the Lado since.

" In January 1913 it is again noted that people were migrating from the French Congo into the Western Bahr-el-Ghazal in considerable numbers, and cases of sleeping-sickness continued to crop up.

" In January 1914, M. de Colonne Beaufait, a senior official in the Belgian Congo, reported they had no sleeping-sickness along the Meridi-Yembio-Tembura section of the frontier, but there was an area on the Belgian-French frontier very heavily infected.

" In January 1915, El Yuzbashi Caesar Effendi Khouri found cases in the Mangaiat Hills, between Raga and Deim Zubeir, and reported that natives were in the habit of going into the French Congo as far as Zemio and Rafai, both heavily infected places, for the purpose of hunting and fishing.

" In April 1915, the same officer inspected Tembura and found four cases, one from Mbitima and one from Tembura, who had both been in the French Congo, one from a village nine miles west of Tembura, and another, village not recorded, neither of whom had ever been in the French Congo.

" In January 1915, El Bimbashi E. M. Parsons Smith found a case in Tembura : a man from Chief Hakpwa whose country is close to the French Congo boundary ; this man had frequently been in the French Congo.

" Reports from Deim Zubeir show that, in 1915, people were still migrating from the French Congo into the Western Bahr-el-Ghazal in considerable numbers.

" In the spring of 1916 an expedition left Tembura to assist the French in quelling a small rising. El Bimbashi J. A. Clark accompanied the force as Senior Medical Officer. There were also attached some 800 natives, levies from local chiefs. On his return Bimbashi Clark reported that the area in which the force operated was very heavily infected and that this infection extended right up to the boundary of the Sudan. On their return to the Sudan, in April 1916, thenative levies scattered to their homes and have since produced a rich harvest of cases.

" In April 1916, Dr. de Lobelle, who was in charge of sleeping-sickness

work in the Aba District of the Belgian Congo, told Dr. Christy that Belgian Congo was infected from the old station of Bafuka westwards through Doruma to the French-Belgian boundary ; that is to say on the tributaries of the Uele River south of the Tembura District and the western part of the Yambio District. Dr. Christy reported that uninspected natives come and go from this area to Yambio District. He found the natives timid and resentful of gland palpation and inclined to run away ; this he attributed to gland puncture practised by former senior medical officers. He notes the lack of good maps in the Merkaz and the lack of information available as to where people live.

" In May 1916, Dr. Christy reported hundreds of people crossing the frontier into Tembura District from the French Congo. These people were from the tributaries of the Mbomu River, the core of the French Congo epidemic. He recommended the closure of the frontier and the appointment of a British officer to deal with the threatened outbreak.

" At Deim Zubeir in July 1916 he found people with enlarged glands but does not appear to have examined either their gland juice or their blood.

" In the same month, the Inspector Tembura heard that further large numbers of French Congo natives had entered his district. An attempt was made to sweep the area by Sudan and French Congo chiefs working in unison ; with the French party was an advanced case of sleeping-sickness.

" September 1916 saw a further big immigration take place; indeed, from now onwards it seems to have been a continuous process.

" In February 1917, a body of these immigrants actually appeared at Wau and four cases of sleeping-sickness were found amongst them. Others of the same party settled in the Western Bahr-el-Ghazal and eight cases were found amongst fifty examined. It is difficult to understand why the Wau settlers were not immediately escorted back to their friends as they had merely lost their way.

" In May 1917, the grave menace of this immigration to the health of the Sudan was pointed out to His Excellency the Governor-General.

" In June 1917, El Bimbashi Parsons Smith reported that the Wau settlers had scattered ; some returned the following month and cases of sleeping-sickness were found among them. More cases were found in another party settled on Mongillia.

" In August 1917, the Governor-General decreed that as these people were political and not criminal refugees they must be allowed to stay. In the same month the Sleeping-Sickness Commission agreed to send a British officer to Tembura to organise the work early in 1918,.

" On March 10th, 1918, El Yuzbashi Nesib Effendi Baz arrived at Tembura to take over sleeping-sickness work ; there was no quarantine camp and no cases were attending for treatment. On March 15th, he examined a batch of 42 immigrants and found by gland puncture that six of these had the disease. From now onwards, cases were found in increasing numbers till by September 30th, 1918, the figures were as follows :

Alive in camp	224
Deserted	19
Returned to Congo	6
Dead	6
Total	255

" On April 11th, a telegram was sent asking for permission to start a camp, and approval was given on May 8th ; instructions to this effect were received at Tembura at the end of May and Baz Effendi thereupon began work.

" The machinery hitherto in force for dealing with the threatened epidemic was as follows :

1. The establishment of police posts on certain roads leading into the Western Bahr-el-Ghazal.
2. The establishment of isolation camps at certain centres in the Western Bahr-el-Ghazal.
3. The addition of sleeping-sickness duties to the work of Medical Officers at Meridi, Tembura and Raga.
4. The establishment of a camp for patients at Raga ; this was not a success and was given up in favour of ambulatory treatment.
5. Settling of immigrants at Wau and Raga with an allowance till their crops were grown ; ambulatory treatment for cases found amongst them.
6. The Regulations drafted under the Publish Health Ordinance in 1910, 1913 and 1914 to govern the movements of people within the infected area and across its borders.

" It is to be noted that from 1907 onwards requests by Governors, Inspectors and inspecting Medical Officers for a British Medical Officer to be stationed in the southern Bahr-el-Ghazal recur like a musical refrain. "

β. *Mongalla.* In this province the districts requiring special consideration are Yei, Kajo-Kaji and Opari or Nimule, as it is in them that nearly all the cases of sleeping-sickness occur. In each of them also there is a sleeping-sickness camp. Yei and Kajo-Kaji used to be in the Lado Enclave, while the Opari district, with Nimule as its chief station, formerly belonged to the Uganda Protectorate. Another but lightly infected district of the province is Loka ; Moru, yet another district, has now been declared free.

When the Lado Enclave was taken over in 1910 it was known to be infected. The Committee has had the advantage of consultation with Dr. Yusef Derwish, of the Medical Corps, Egyptian Army, who has had 15 years experience of sleeping-sickness work in the Southern Sudan and who kindly submitted a copy of his report for 1922.

From the latter it appears that when he was Medical Officer in charge of Mongalla Station on the main Nile in 1909 and 1910 he used occasionally to visit Lado Station, the Headquarters of the Lado Enclave, and that there he obtained information from Dr. Errara as to the prevalence of sleeping-sickness at Yei and the villages on the river of the same name. He reported the matter and commented on the danger of the situation. When the Lado Enclave was taken over a survey was at once made and several villages in the Yei District were found to be heavily infected. In 1909 Dr. Derwish suggested that in all probability the source of infection was caravans of porters from Uganda and this has proved to be the case. As a matter of fact, at the time he wrote there existed between the western limit of the Yei District and the nearest infected area in the Belgian Congo, a stretch of country which it took a month's march to traverse and where the natives enjoyed an absolute freedom from sleeping-sickness.

Energetic measures were taken by the Sudan Sleeping-Sickness Commission, which prevented the disease spreading to the Rejaf, Moru and Meridi Districts and did much towards eradicating the disease in the Yei River District. A sleeping-sickness camp was formed at Yei and an inspection post was established at Mongalla on the main Nile to deal with possible cases coming from Uganda.

The Kajo-Kaji and Opari Districts have also been shown to have acquired the infection from Uganda (*vide infra*).

2. *Report for* 1918.

Bahr-el-Ghazal. The report recounts the construction of a sleeping-sickness camp at Tembura and contains useful notes on the feeding of patients and the raising of crops for their support. The areas to be cleared at Tembura itself and along the Wau-Tembura and Tembura-Yambio roads are considered and an account is given of an initial inspection in the most easterly part of the district. Of the 255 cases which had been found, 18 were undoubtedly due to local infections. The rest had either visited the French Congo or had immigrated from it. An account is given of the frontier traffic, but as this changed considerably since the date of the report it is unnecessary to quote from it. The chief danger at that time was from the French Congo, but steps were taken to prevent immigration as far as possible. The Belgian Congo is stated to be more in touch with Yambio than with Tembura.

Traffic with the central districts of the Bahr-el-Ghazal is also considered. It is pointed out that the line of spread of the disease has always been along the rivers, *i.e.* the Yei, Kaia, Nbomu and Welle. As the head waters of the Sueh River are infected it may serve as a channel of infection. A recommendation is made that a new route should be found cutting *across* all the streams and controlled by clearings at the crossings, *G. palpalis* being the fly concerned. The route from Tembura to Tembe is indicated (*vide* Map F). It will be seen that it passes through Yambio, Meridi and Amadi. The headquarters of each section, it is stated, would have to be at the eastern boundary of its Merkaz to prevent unnecessary intercommunication.

Little information is forthcoming about Yambio District. It is stated that there may be a few cases there. Stringent measures were taken to reduce traffic to a minimum. In the Western District there were 32 cases under treatment. They live in a fly-free site at Khor Faragalla, about 5 miles from Raga. There were 10 admissions and 10 deaths. All the new cases were refugees from the French Congo, and the danger of intercommunication is mentioned.

Western Mongalla.

Yei River District. Admissions to Yei Camp numbered 32, as against 14 in 1917. 22 of these cases came from three villages: Bajelu, Lasuba and Abdulla. These have now been moved some miles to fly-free sites. A considerable number of patients who had apparently recovered as the result of treatment were discharged and sent to their homes with instructions to report for examination every two months. Of 50 so discharged in March 1918, 49 were in good health and free from trypanosomes in August. One had died from dysentery.

Kajo-Kaji District. Admissions to camp here numbered 41, as compared with 98 in 1917. The decrease, however, is said not quite to represent the true state of affairs, as the death of the British Inspector and absence of a successor made it difficult to collect the natives during inspections.

Total number of patients in the camp : 322. This camp was opened in 1915, so that no patients are yet ready for discharge.

Eastern Mongalla.

Nimule District. All persons arriving from the south are examined by a special medical office.

Various villages were moved inland from the Nile.

The following summary of the work for the year is here transcribed :

Province	District	New cases found	Examinations		Atoxyl	Injections	
			By palpation	By gland puncture		Arseno-benzol	Antimony
Bhar-el-Ghazal	Wau		71	25	4		
do	Raga	10	15296	48	789		9
do	Tembura	255	11790	796	1298		
Mongalla	Yei River	32	93262	128	3017		28
do	Kajo-Kaji	43	7534	78	1597	6	39
do	Nimule	1	21786	3	1		
Totals		341	149739	1078	6706	6	76

Number of persons under treatment in Sudan Sleeping-Sickness Camps on October 1st, 1918 :

Yei	216
Kajo-Kaji	323
Raga	32
Tembura	232
Total	803

3. *Report for* 1919. No new area infection was discovered in the Sudan during the past year.

Bahr-el-Ghazal.

(a) *Tembura District.* Fresh cases numbering 646 were detected. There were 69 deaths. It was decided to establish a segregation area instead of a camp, owing to feeding difficulties. A site has been chosen on the Yubo River.

The population of the district is estimated to be 42,000. It is stated that of the 4,000 to 5,000 immigrants who entered the Sudan from the French Congo during the last four years, 1,250 have returned to their homes, and no fresh movement has taken place. The recommendation is made that the infected settlement of immigrants be removed from the Nomantina River near Wau to the Tembura District. This would clear the central district of infected people.

As regards intercommunication with the French Congo, it was found that intercourse had practically ceased owing to the hearty co-operation of the chiefs along the frontier who have become educated to and aware of the dangers of the disease and readily given information of the presence of new arrivals. A mail service from Tembura to Gubere is maintained once a month by runner, the men being changed at the frontier.

The movements on the roads to the Belgian Congo are also controlled.

(b) *Yambio District.* One case found : a visitor from Tembura.

(c) *Western District.* During the year there were 9 admissions and 4 deaths. All cases admitted were refugees from the French Congo. There were 33 cases under treatment at Khor Faragalla.

Western Mongalla.

(a) *Yei River District.* Cases admitted to camp : 15, as compared with 32 in 1918. There were 15 deaths. 54 patients were discharged, making a total of 180 persons discharged, apparently cured, since March 1918. Of a total of 560 patients admitted to

camp since its commencement in 1911 till April 1919, no less than 32, *i.e.*, 14 per cent, have been discharged in excellent condition with no signs of the disease.

(b) *Kajo-Kaji District.* There were 71 admissions, as compared with 41 last year. The deaths numbered 42. 344 patients were under treatment.

Eastern Mongalla.

(a) *Nimule.* Nine cases detected in the district and transferred to the camp at Kajo-Kaji, except two who were natives of Uganda and so were sent back to that country in accordance with the agreement existing between the two Governments.

An uninhabited strip of country ten miles wide is now maintained along the east bank of the Nile from Nimule to Rejaf.

The following summary will be found useful for comparison.

Province	District	New cases found	Examinations		Injections	
			By palpation	By gland puncture	Atoxyl	Salvarsan
Bahr-el-Ghazal	Tembura	646	87050	1119	6470	
do	Raga	9	12620	19	414	
Mongalla	Yei River	15	89985	87	2179	
do	Kajo-Kaji	63	19037	122	2167	7
do	Nimule	9	24580	10	2	
Total		742	233272	1357	11232	7

Number of persons under treatment in Sudan Sleeping-Sickness Camps on October 1st, 1919 :

Yei	154
Kajo-Kaji	344
Tembura	690
Raga	33
Total	1221

4. *Report for* 1920. Nothing very notable is recorded for this year and it will be sufficient if the summary is given :

Province	New cases found	Examinations		Injections			
		By palpation	By gland puncture	Atoxyl	Antimony	Arseno-billon	Arsenious acid.
Mongalla							
Yei River	32	86528	224	1533			
Kajo-Kaji	56	23415	180	2787	197	15	
Nimule	4	11224	8	2			
Bahr-el-Ghazal							
Tembura	175	18836	412	21442		20	658
Raga	10	12472	17	432			
Total	277	152475	841	26196	197	35	658

Number of persons under treatment in Sudan Sleeping-Sickness Camps on October 1st, 1920 :

Yei	145
Kajo-Kaji	353
Tembura	708
Raga	34
Total	1240

It should be noted that a new type of sleeping-sickness camp was formed in the Tembura area on the principle of a self-supporting village with opportunities for domestic life. It is placed in proximity to the French frontier.

5. *Report for* 1921 records an alarming increase of 723 new cases almost entirely arising in the Tembura District, where 656 new cases were discovered. An important section of the report, which is signed by the Principal Medical Officer, Egyptian Army, is concerned with the conditions which have arisen in Eastern Mongalla.

α. He begins with a quotation from his 1920 report as follows :

> " Sleeping-Sickness in Mongalla, East of the Nile.
>
> " So far, only that part of Mongalla Province which lies to the west of the White Nile has been found to be badly infected with sleeping-sickness.
>
> " The conditions on the east bank are favourable to the spread of sleeping-sickness in a northward direction from Uganda, but no cases have yet been reported. The danger of this part becoming infected has not been lost sight of, and the Senior Medical Officer, Mongalla, has been instructed to keep a look-out for suspicious cases."

and continues :

> " Our fears have been fully justified, and the Senior Medical Officer, Mongalla, reported the discovery of 22 cases in this area. There is no doubt that the disease has spread into this part from the neighbouring part of Uganda, *viz.* Gulu and Kitgum, which have been infected for several years.
>
> " This disease has been allowed to spread northward owing to the fact that the boundary between Uganda and the Sudan is arbitrary and not tribal ; thus the boundary runs across tribes who are half Uganda and half Sudan. There is then bound to be communication between the two halves of the tribes across the frontier and the consequent spread of sleeping-sickness from Uganda into the Sudan. This can only be prevented by strictly enforcing that no communication should take place across the frontier.
>
> " That this indiscriminate communication across the frontier should be stopped entirely or at least put under control has now been sufficiently realised, but there are objections, as this is an international frontier, and effective closure of such a frontier would require the co-operation of the two Governments concerned.
>
> " This has been pointed out to the Authorities concerned and it is hoped that concerted action will be taken on this subject by the civil authorities so concerned. The proposal is that communication across the frontier should be stopped except by permit, and then only through the frontier post of Nimule, where the permit-holders can be examined for sleeping-sickness.
>
> " It is important that the route *via* Nimule should, if possible, be kept open, as this is on the main Cape-to-Cairo route, but it is of equal importance that this route should be efficiently controlled as it runs through a part which is

now infected with sleeping-sickness, and, in the past, it has been the universal experience that the prime cause of spread of sleeping-sickness has been movement of caravans accompanied by large numbers of human carriers. It is hoped that in time the motor transport will be in use on this route.

"I am glad to report that active steps have been taken to combat this new outbreak of sleeping-sickness in Mongalla Province, *viz.* a camp has been formed at Nimule and the civil administration has assisted whole-heartedly in taking steps by limiting the movements of the inhabitants and moving of villages, etc., so that the disease may be checked before it has taken too firm a hold on the inhabitants.

"Finally, it must be realised that sleeping-sickness is now definitely established in the Sudan and that, if allowed to progress, will ultimately decimate the inhabitants of the parts affected. That the disease can be checked has already been proved, but it is only by concerted action that any hope can be held out for the ultimate eradication of this disease. As has been pointed out above, this disease is not indigenous in the Sudan but has spread into the Sudan from the adjacent territories of French Equatorial Africa, Belgian Congo and Uganda.

"At present this disease is being fought independently in French Equatorial Africa, the Belgian Congo, Uganda and in the Sudan. I would most seriously enter a plea that the time has now come when the Governments concerned should agree to work on similar lines and to co-operate with each other in the attempt to stamp out this disease.

"Without such international co-operation there is little prospect of the disease being eradicated from the Sudan."

The Committee is of opinion that these last paragraphs will possess special interest for the Health Section of the League of Nations.

. *Bahr-el-Ghazal.*

Tembura District. The conditions are described as far from satisfactory, and comment is made on the tendency of the disease to spread east and north-east, The discovery of 656 new cases is noted. Although the regions near the French Congo frontier still supply the greatest number of cases, the area surrounding Tembura Station is now very heavily infected and the disease is extending along the River Yubo in the direction of Sueh.

The progress of the disease is indicated by the subjoined table :

	Admitted	Repatriated	Died	Deserted	Returned	Balance
15-3-18 to 30-9-18	255	6	6	48	29	244
1-10-18 to 30-9-18	621	"	69	125	39	466
1-10-19 to 30-9-20	192	"	102	100	28	708
1-10-20	656	3	124	76	28	1189

Twenty of the above deaths are to be attributed to influenza.

Yambio District. There is great danger of the Yambio District becoming badly infected from Tembura. In all probability the disease already exists in Yambio.

In connection with the general sleeping-sickness work in the district, the following pregnant remarks are made by the special Medical Officer in charge of operations :

> " The more one sees of the country the more one realises how impossible it will be to obtain a complete inspection of the people of the district until they have been collected into villages. It is so easy to conceal women and children in the khors where they will never be found, and often it is not even necessary to go as far as a stream since the long grass offers such effective concealment for the greater part of the year. Those who live near the frontier frequently cross into French or Belgian territory and remain there until the officer inspecting has passed into the country of another chief. These offenders are frequently caught and punished, but superstition is ingrained in the people and is, with many, stronger than fear of punishment. To be able to cope with all these difficulties, friendly co-operation with the French and Belgian Authorities is absolutely essential. If the people once realise that at our request the French and Belgian Authorities are willing to arrest and return to us for punishment offenders of sleeping-sickness regulations they will soon become resigned to their fate and become much more amenable to discipline. It is partly for this reason that a friendly relationship has been cultivated with both the French and Belgian Authorities. Our proximity to the French Congo frontier makes it easier for us to keep on very friendly terms with the French Government officials. The Chef de Post at Obo has twice paid us a visit at the settlement and spent the night on each occasion. I have also had correspondence with Dr. Gilly, the new French S.M.O. at Zemie, who has been specially sent there for the sleeping-sickness prophylaxis, who hopes to pay us a visit, together with the Chef de Post, towards the end of October. During the last inspection of the country close to the Belgian Congo frontier, Yous Nesib Eff. Baz, at my request, paid a visit to Ndoruma on the invitation of the Belgian Administrateur.
>
> " Both French and Belgian officials are strongly in favour of the village system for the Zandeh, and also took much interest in our settlement for patients. The French Chef de Post has also arrested and sent back to us a deserter from the Sudan, and this has considerably impressed the people. If this ' entente cordiale ' becomes general the troubles of the future S.M.O.s here should be greatly reduced.
>
> " The population of Tembura is said to exceed the former estimate of 42,000. It may even exceed 50,000."

As regards segregation in villages, it is pointed out that the concentration should be carried out at the same time in the territories of all the different chiefs and that the villages should each contain not less than 30 or 40 families. The concentration should take place during the dry season.

As regards intercommunications, it is asserted that the Tembura-Tombi Road *(loc. cit.)* has not proved the success that was anticipated. Goods take months on the road, there is much theft, and there are difficulties in the Mongalla Province Section, where the ground is low-lying, and there is trouble in obtaining porters.

The only other road by which stores can be conveyed is that to Wau. It is thought that, with due precautions, it may be used. The remarks on the question of trading are of special interest and are here reproduced :

> " Trade between the natives in Southern Bahr-el-Ghazal and those of the French and Belgian Congos goes on with the utmost regularity. The chiefs themselves are amongst the greatest offenders but are cunning enough not to

be caught out. If a native doing business for a chief is caught in the act he will take the whole of the blame on himself in practically every case. The native cannot understand why he should not trade across the frontier for such things as he cannot obtain in his own country, and in certain ways I have great sympathy with him. The merchants in this district have kept prices up to a war standard. In addition they are badly stocked. A spear bought at the merchants in Tembura costs P.T. 15. A practically similar spear at Ndoruma in the Belgian Congo costs about P.T.6. Maluds at Tembura cost twice what they do at Ndoruma. In addition the supply sent to Tembura of spears and maluds falls far short of the demand. During the great part of the wet season maluds were unobtainable at Tembura, whereas they could always be bought at Ndoruma. Naturally enough, such natives who wanted maluds for their cultivation obtained them from the Belgian Congo. It was just the same with spears. The merchant at Ndoruma obtains all his spears and maluds from the Mombuto country, where iron appears to be plentiful and blacksmiths to work it into shape are numerous. He is thus always well stocked. It is not the fault of the merchant at Tembura that this stock is so poor. He gets everything from the main store of his employer at Wau. Spears and maluds may appear small things to us, but to the Zandeh they are extremely important. Spears are the sole currency for wives, and without maluds he cannot plant a cultivation and so must go hungry. I have gradually come to the opinion that unless the merchants at Tembura can be kept well stocked with goods at reasonable prices it would be much better to permit one of the merchants in the Belgian Congo (who have always asked for licence) to trade in the Tembura District.

" Ndoruma District is said to be uninfected as yet. El Youtbashi Nesib Effendi Bar informs that the streams crossed on his way to Ndoruma Station are exactly similar to those on the Sudan side of the Divide, and that they are uncleared. Such being the case, Ndoruma will not remain long uninfected, especially if the natives from heavily infected streams of Mboki, Mongu and Yubo in Tembura District and from Mbomu region in the French Congo trade there. Natives from Yambio District also trade with Ndoruma and there is thus a great danger that in the course of time this place will become a new focus of infection from whence the disease can spread eastwards. It is for this reason that I consider that articles in great demand by the natives should be easily procurable locally, otherwise he will travel long distances to obtain what he requires and possibly do incalculable harm by spreading sleeping-sickness into hitherto uninfected districts."

Western District. Only two new cases are reported from Raga. 28 persons were under treatment in the camp there.

γ. *Western Mongalla.*

Yei River District. The results achieved are stated to be satisfactory and the success is attributed largely to the following four factors :

1. The district had been energetically administered by the Belgians prior to our occupation.
2. The natives were both friendly and easily dealt with.
3. The population was comparatively small, thus giving plenty of room for village removals (there are only 6,000 able-bodied males).
4. Backing has always been received from the Civil Authorities.

There were 24 admissions, as compared with 32 in 1920 and 15 deaths. All except 3 came from Chief Bajelu's village, which has always been a source of the disease despite the stringent measures taken. It is, however, noteworthy that all the cases there have been diagnosed either clinically or by spinal puncture, *i.e.* there were no enlarged glands, and furthermore all the cases were in adults. It would therefore seem that these so-called " new " infections really date back 3 ½ years when the village was on a bad site, and that this time had to elapse before a diagnosis could be made owing to the absence of adenitis and of clinical symptoms at an earlier period.

Eleven patients were discharged, making a total of 222 set free. These eleven had been in the camp over 5 years. The history of the discharged cases is given but cannot be quoted here. It may, however, be said that 196 are in good general health.

Comment is made on the fact that in this district the birth-rate is increasing and the infantile mortality greatly diminishing. This is interesting in the light of the French observations above recorded (p. 37).

The only information regarding Kajo-Kaji is contained in the annexed table :

Province	New cases found	Examinations		Injections	
		By palpation	By gland puncture	Atoxyl	N. A. B.
Bahr-el-Ghazal					
Tembura	656	73035	1938	34223	8
Raga	2	14575	2	367	
Mongalla					
Yei River	24	114427	149	4876	
Kajo-Kaji	41	34643	96	2411	10
Total	723	236680	2185	41877	18

Number of persons under treatment in Sudan Sleeping-Sickness Camps on October 1st, 1921 :

Yei	148	
Kajo-Kaji	322	
Tembura	1189	
Raga	28	imported
Total	1687	

It will be seen that this table contains no reference to Eastern Mongalla. Reference has, however, already been made to this area, in which 22 new cases were discovered during the year.

6. *Report for* 1922. The general report has unfortunately not yet been received nor can any report on the Bahr-el-Ghazal Province be quoted, which is unfortunate in view of the important developments which have been occurring there.

The Committee has, however, been informed by Dr. Derwish that since 1921 no traders or natives have been allowed to enter the Bahr-el-Ghazal from either the French or the Belgian Congo. The only persons permitted to enter are French and Belgian officials proceeding on leave (each can bring two servants) and missionaries, provided they adhere to road regulations. No settlement of any kind is permitted.

Fortunately, as already stated, Dr. Derwish's Annual Report on Sleeping-Sickness in Mongalla Province for the year ending August 31st, 1922, has been available, and he has been good enough to submit a sketch map illustrating it (Map.G).

α. *Western Mongalla.*

Yei River District. Number of patients in camp at Yei : 141. Number of admissions during the year : 7, being 0.17 per 1,000 of the population. Eighteen deaths occurred in the last *eleven* months, 13 amongst natives from Chief Bajelu's village.

No patients were discharged during the year, but 80 patients in good and fair condition were granted one month's leave after a short course of atoxyl.

Kajo-Kaji District. In December 1921 this was made the headquarters of the sleeping-sickness work in Mongalla Province, thus replacing Yei.

This was necessary, as it is the most heavily infected of the Mongalla Districts and is nearer Opari, where the disease is making progress.

The introduction of a leave scheme similar to that introduced at Yei did good, rendering the patients in camp more content. Out of 150 sent on leave after a short course of atoxyl, 34 returned to camp within 20 days and the remainder returned punctually at the expiration of their month.

Number of patients in camp : 339 ; number of admissions : 68, being 3.6 per 1,000 of population ; number of deaths during the last *eleven* months : 27.

Eastern Mongalla.

Nimule-Opari District. The camp at Nimule was started in April 1922, and all patients originally from the Opari District and admitted to the Kajo-Kaji Camp were transferred to Nimule. The leave scheme was also introduced here with excellent results.

Number of patients in camp : 57 ; number of admissions during the year : 35, being 2.3 per 1,000 of population ; number of deaths during the year : 7.

A good many details are given regarding the various villages infected in the different districts, but these are not reproduced, as for all practical purposes the map appears to furnish sufficient information.

The paragraphs dealing with the future prospects of these districts are, however, suggestive and are here transcribed in full :

Yei River District. The disease is steadily decreasing in Yei District, so one is justified in formulating an optimistic prognosis on that district. But it will be suicidal to the sleeping-sickness interests of the district if the restrictions are relaxed before five years have elapsed since the last case detected. Any slackness in the measures might lead after some length of time to a state of affairs similar to that of 1911. We have been taking great trouble to reach this good result; it will be a thousand pities if a precipitation in opening up the district should lead the way to a disaster. The future prospect of that district depends on two facts : (1) the carrying-out of the sleeping-sickness administration energetically as in the past ; (2) the full co-operation of the Civil Authorities. Thorough watching of this district must be maintained for the coming years, the line of conduct to be strictly adhered to.

As to *Kajo-Kaji District*, all I can say is that the disease is now well controlled, and with the measures already adopted, there is great hope of reaching an ultimate success, provided that the disease is properly dealt with on the other side of the boundary. In Kajo-Kaji there are real advantages which would help in an anti-sleeping-sickness campaign, chiefly the very limited traffic of natives and the little amount of carrying. The only drawback is that on the other side of the boundary and in close vicinity of it the disease is raging.

As to *Opari District.* Here again the disease is now well under control; and, as mentioned before, the sleeping-sickness is not yet deeply rooted; the more energetic the measures are the quicker the results will be.

The measures adopted in the Yei River District were fully detailed in the last year's report.

For Kajo-Kaji the following scheme is adopted:

(1) Restrictions on intercommunication between the southern and northern parts of the district. This is not felt by the natives, as the inhabitants in these two halves are different tribes and they very seldom visit each other.

(2) Systematic clearing of khors along the roads and paths and of drinking khors of the village.

(3) Regular inspection of the villages in such a way that the infected area is visited once every two months and the non-infected one once every four or five months; thus the cases are detected at the early stage of infection and the chance of their infecting the flies is steadily minimised.

(4) Stopping intercommunication of natives between the Sudan and Uganda; three terebais (a kind of special police) are posted in the three villages neighbouring the boundary and patrol that area; although one cannot expect to have such a large area properly controlled by three terebais, yet the moral influence is to be considered when one is dealing with natives, and no doubt the movements across the boundary have been greatly reduced. The question of the boundary will be dealt with in the next chapter.

(5) Removal of villages. Three wakils, on the recommendation of Yuzbashi Faiz Effendi Nasser, have been shifted from the Nile Bank to new sites near their chiefs; thus a large gap of unhabited area is created on both banks of the Nile which will help to stop intercourse of natives between Opari and Kajo-Kaji.

It will be of the utmost importance to remove the Bari villages, belonging to the Rejaf District on the opposite side to Kajo-Kaji, to new sites somewhere along the Rejaf-Uma Road. I have already raised this question and communicated my views to the Governor and to the District Commissioners, Opari and Rejaf.

The question of removing the infected villages of Kajo-Kaji District from their present sites cannot be considered, as this district is so thickly populated that it is not possible to find places to effect such removals; the following figures show how thickly populated is the Kajo-Kaji District compared with Yei and Opari Districts. In Kajo-Kaji the average population per square mile is 16.4; in Yei it is 5.53, and in Opari 5.00. In 1915 Major J. T. Simson, R.A.M.C., shifted Bulmatary from the vicinity of the Kayu River to a place near Yanghy; this was all that could have been done. Even if room is available, removing an infected village from Southern to Northern Kajo-Kaji will be a bad policy as it gives a chance to infect the northern part of the district. The only thing is to have the khors kept clean and more especially the drinking khors neighbouring the villages. This is being done.

Opari District. (1) Khors to be cleared regularly; (2) the Madi tribe is to be inspected regularly once every two months and the Acholi tribe once every four or five months; (3) no intercommunication of natives between the Madi and Acholi tribes and also between this district and the other districts of Mongalla Province and Uganda.

The District Commissioner, Opari, is having an office at Panikwara once a month for the settlement of the cases of the Acholi.

I have fully dealt in a previous report with the question of the Madi and Acholi tribes and discussed the chances for and against the possibility of the eventual infecting of the Acholi tribe; and my conclusion was that, for the time being, the Acholi cannot be considered as infected and it is very possible that, provided the measures are strictly

enforced, we can succeed in saving the Acholi. Of course, if we succeed in eradicating the disease from the Madi we will contribute largely to the safety of the Acholi. Such instances have already occurred in the past; thus the Moru District, after being separated from Yei District, in spite of the seven sporadic cases detected there up to 1914, and the Loka Sub-District, in spite of the few cases found, have escaped the infection, and I do not see why the same result should not be obtained with the Acholi ; of course this requires careful watching.

By its situation the Opari District is the natural junction between the Sudan and Uganda ; and as the Rejaf-Nimule road is to be kept open, this will necessitate the use of a large number of carriers along the Rejaf-Nimule Road. I have emphasised on various occasions the harm the use of carriers causes to the sleeping-sickness interest of a district, and I have strongly recommended the instalment of mechanical transport on the Rejaf-Nimule Road. On the adoption of this transport depends the safety of the district and the welfare of the natives ; I recommend it strongly again in this report. Considering the villages are sited along that road and that most of these villages have already given sleeping-sickness cases, it is obvious that the carrying in such conditions is more dangerous than that done on uninhabited roads.

Until the mechanical transport is established we have to make the best of what we possess. To make this carrier transport least harmful I recommend that each caravan be convoyed by a regular escort of one non-commissioned officer and three police or more according to the size of the caravan, the duty of the escort being to see that the carriers walk together and to prevent them from loitering near khors and in the rest houses.

Three villages are going to be shifted during the next dry season to suitable sites : Serur Abu Kraa, Wani Muko and Nyam Kuyo.

The site for Serur Abu Kraa is already fixed by Yuzbashi Faiz Effendi Nassar ; the sites for the other two villages will be fixed shortly by Bimbashi J. H. Baird ; a gap of at least ten miles is going to be created between Uma River and the first village of Opari District.

β. Dr. Derwish supplies certain information as to the conditions of those parts of adjoining territories situated just across the boundary lines, *i.e.*, the Belgian Congo and Uganda. This is given here as likely to be useful :

Aba District (Upper Uele) (Belgian Congo). No definite information has been received lately. Up to 1919 there was a doctor there in charge of sleeping-sickness and he found a few cases now and then, chiefly on the western-south-western side of our boundary. I understood from him that the parades were not satisfactory and he thought that there may have been a few cases undetected. Since 1919, the medical work in that district was given to the doctor of the Inland Africa Mission ; and, considering the amount of medical work entrusted to the doctor in such a large area, it was impossible for him to tour the district and investigate sleeping-sickness ; therefore the inspection of the villages can be considered as having been stopped since 1919.

Dr. Woodhams, Africa Inland Mission, who visited me in November 1921, told me that he found two cases of sleeping-sickness in September 1921 amongst a lot of carriers from Kitambara's village (west-south-west of Yei) sent to him by the Civil Authorities for examination.

Otherwise he was unable to give me any definite information on sleeping-sickness there.

In July, while I was at Yei, I received a letter from the doctor, who was at Aba up to 1919, asking me if I could meet him by the middle of August on the boundary, as he was newly appointed Medical Officer in charge sleeping-sickness work in Uele

District ; having had to return to Kajo-Kaji by the beginning of August, I wrote to him asking him to send me a summary of his information on sleeping-sickness in his district. I had a note from him in Rejaf just before leaving for Khartoum and his information is as follows : He inspected the Northern Dungu District up to the boundary of Bahr-el-Ghazal and he did not find a single case of sleeping-sickness. In the District of Duruma, contiguous to the French Congo, sleeping-sickness is raging. This district is closed, but the removal of villages is going to take place shortly under the supervision of the Medical and Civil Authorities. He had not then been able to inspect Aba District ; he heard that few cases were found there and that he received instructions to inspect thoroughly the District of Aba and take measures according to the results of his inspection.

This is all the information I received from him in a private letter.

γ. *Uganda.* The part of Uganda contiguous to Yei District, *i.e.*, Arua District, is considered as not infected ; but in May 1922, at Rejaf, I met Mr. Black, Assistant District Commissioner, Arua, who told me that they found lately sporadic cases amongst the Longwary's tribes. The District of Madi (Moyo and Katarungu), contiguous to the Kajo-Kaji District, is very heavily infected. The District of Gulu, bordering part of Opari District, is heavily infected.

The District of Chua, bordering the Acholis and Ikotos, has been partially inspected lately by the Senior Medical Officer, sleeping-sickness, Uganda, and he found three cases in the part he inspected ; he mentioned a few cases detected in previous years and they were traced to have been infected outside the district. The Senior Medical Officer, sleeping-sickness, is not quite positive in his conclusion whether sleeping-sickness can be stopped from invading Chua District or not.

Everywhere we turn our eyes round the boundary we find in some parts uncertainty and doubt ; in some others the spectre of the disease threatening them and in the rest the most alarming state of affairs.

As the boundaries are not tribal he considers there is considerable risk from intercommunication. He is of opinion that no natives from Uganda should be allowed to enter the Sudan.

It will be seen that, so far as the Medical Authorities are concerned, a very careful watch has been kept on sleeping-sickness in the Sudan, and that energetic measures have been taken for dealing with it. For all that, it is clear that at the present time the situation is disquieting as regards the Southern Bahr-el-Ghazal and those parts of Mongalla Province bordering on Uganda.

δ. Special mention must be made of a paper by ARCHIBALD published in 1922 on the occurrence of *T. rhodesiense* in a case of sleeping-sickness from Tembura. The morphological characters of the parasite and its pathogenicity left no doubt as to its identity, and Major Archibald's opinion is shared by Professor Warrington Yorke, of the Liverpool School of Tropical Medicine. This is the first record of *T. rhodesiense* occurring in the Sudan, and, apart from the importance of the discovery, it is interesting in the light of Carpenter's remarks regarding the Madi district of Uganda (page 97).

IV. Other Territories.

The Committee has collected from private sources and from the literature a certain amount of information regarding human trypanosomiasis in Abyssinia, Portuguese Africa and the Spanish Territories on the Gulf of Guinea, but it is felt better to await the results of the official enquiry which has been made before dealing with these regions especially as the data regarding them are fragmentary and in some cases not of recent origin.

It is therefore proposed, at a later date, to submit a second interim report, bringing information, as far as possible, up to date and including those countries which are now omitted. Thereafter, it is hoped that a final report will be submitted containing the Committee's views and recommendations, both as regards tuberculosis and sleeping-sickness.

The members of the Committee trust that such an arrangement will commend itself to the Health Committee of the League of Nations and that the information herewith furnished may be found of service.

In this hope they have the honour to subscribe themselves :

Andrew BALFOUR, *Chairman.*
Em. van CAMPENHOUT.
Gustave MARTIN.
Arthur G. BAGSHAWE.

April 1923.

List of Papers dealing with Sleeping-Sickness in Equatorial Africa or having a direct bearing on the Subject.

(Those marked with a star have been consulted.)

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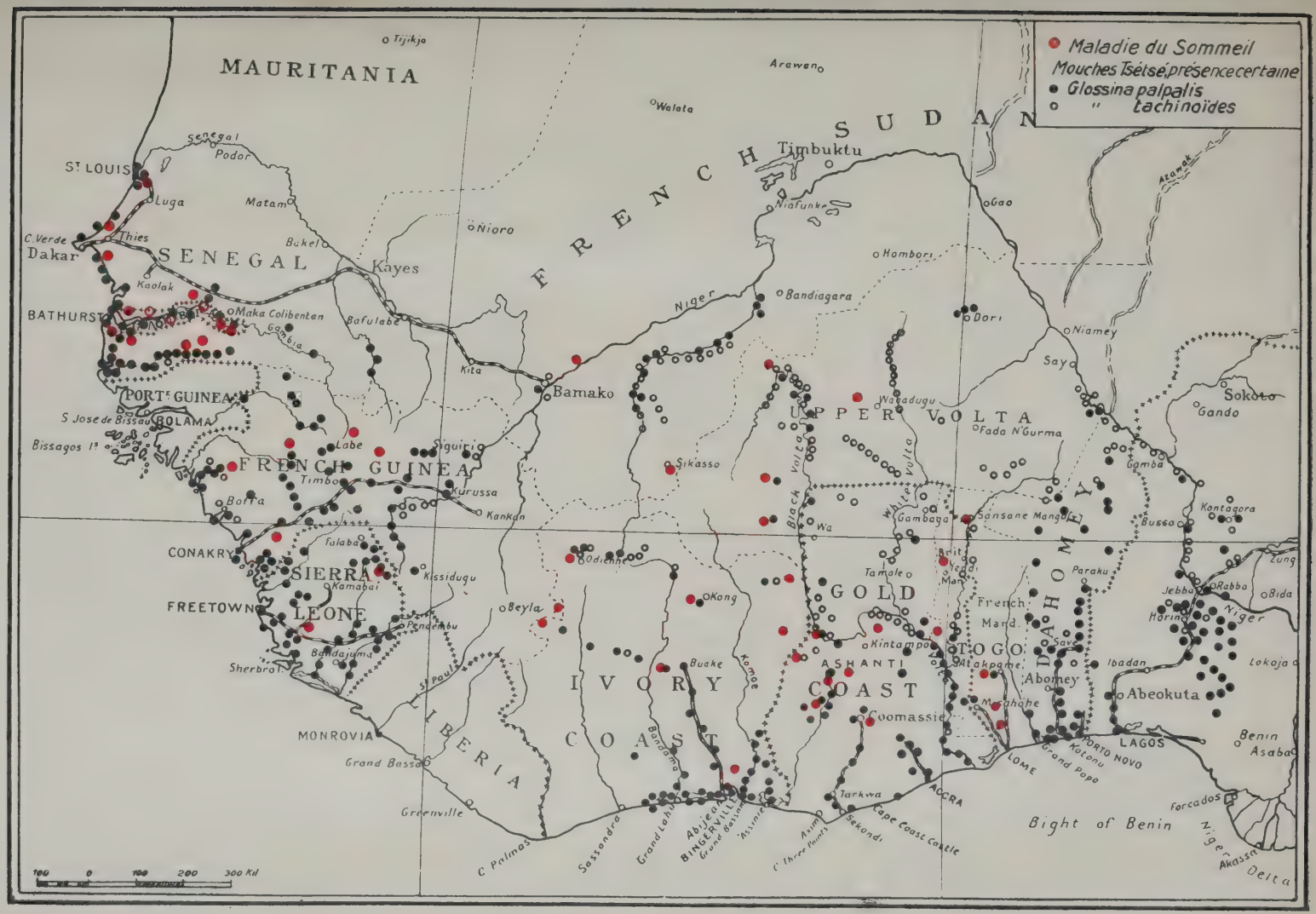
*Zupitza, M. *Northern Rhodesia : Reports on Public Health presented to the Legislative Council.*

MAP A


Maladie du Sommeil
Mouches Tsétsé, présence certaine
Glossina palpalis
" tachinoïdes
MAURITANIA
FRENCH SUDAN
SENEGAL
FRENCH GUINEA
PORT. GUINEA
BOLAMA
CONAKRY
SIERRA LEONE
FREETOWN
LIBERIA
MONROVIA
IVORY COAST
GOLD COAST
ASHANTI
UPPER VOLTA
DAHOMEY
TOGO
St LOUIS
Dakar
BATHURST
Bissagos Is
S. Jose de Bissau
Timbuktu
Bamako
Kayes
Sikasso
Kankan
Kissidugu
Kamabai
Bandajuma
Sherbro
Grand Bassa
Greenville
Sassandra
Grand Lahou
Abidjan
BINGERVILLE
Grand Bassam
Assinie
Cape Three Points
Sekondi
Tarkwa
Cape Coast Castle
ACCRA
Coomassie
Kintampo
Buake
Kong
Beyla
Bodienne
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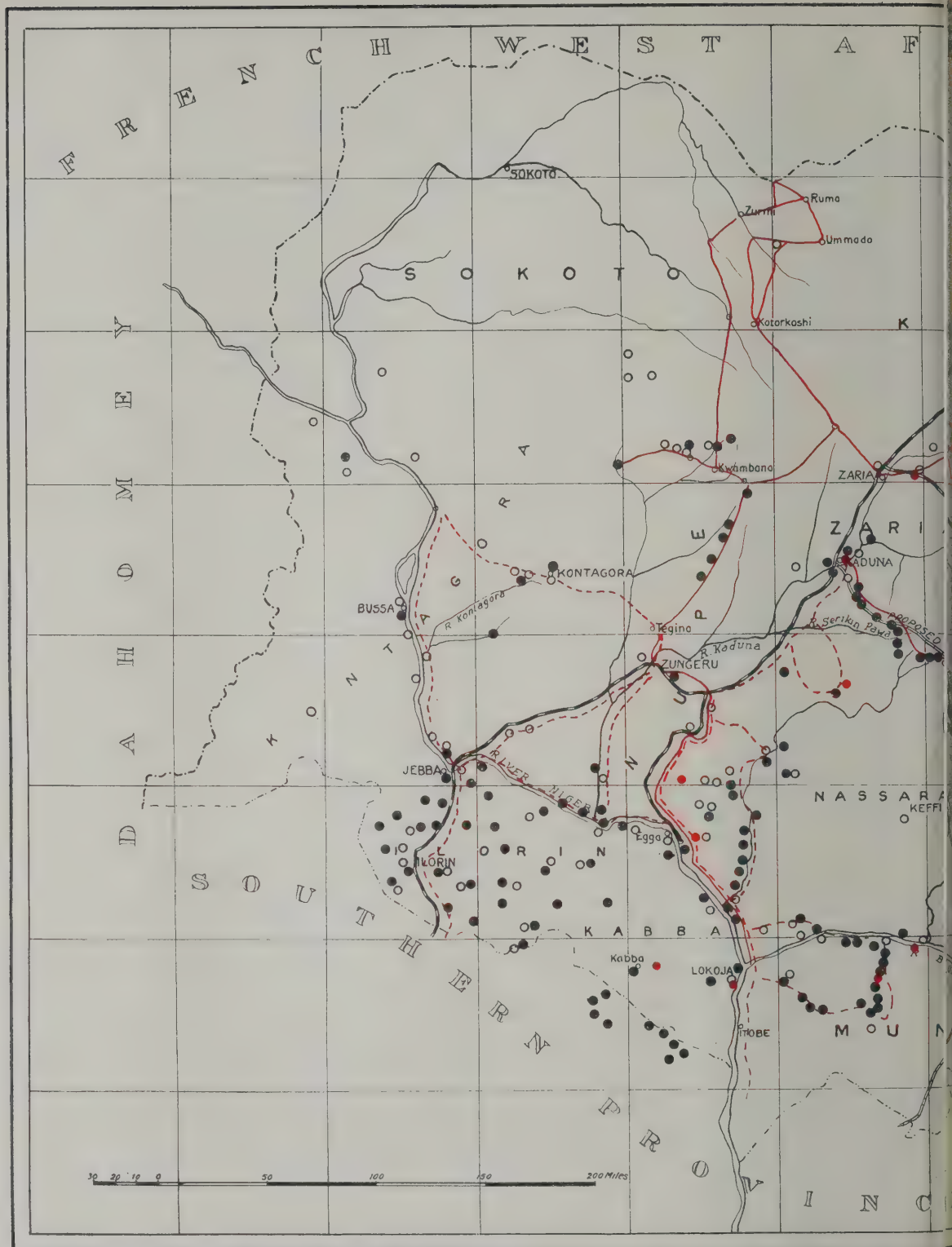
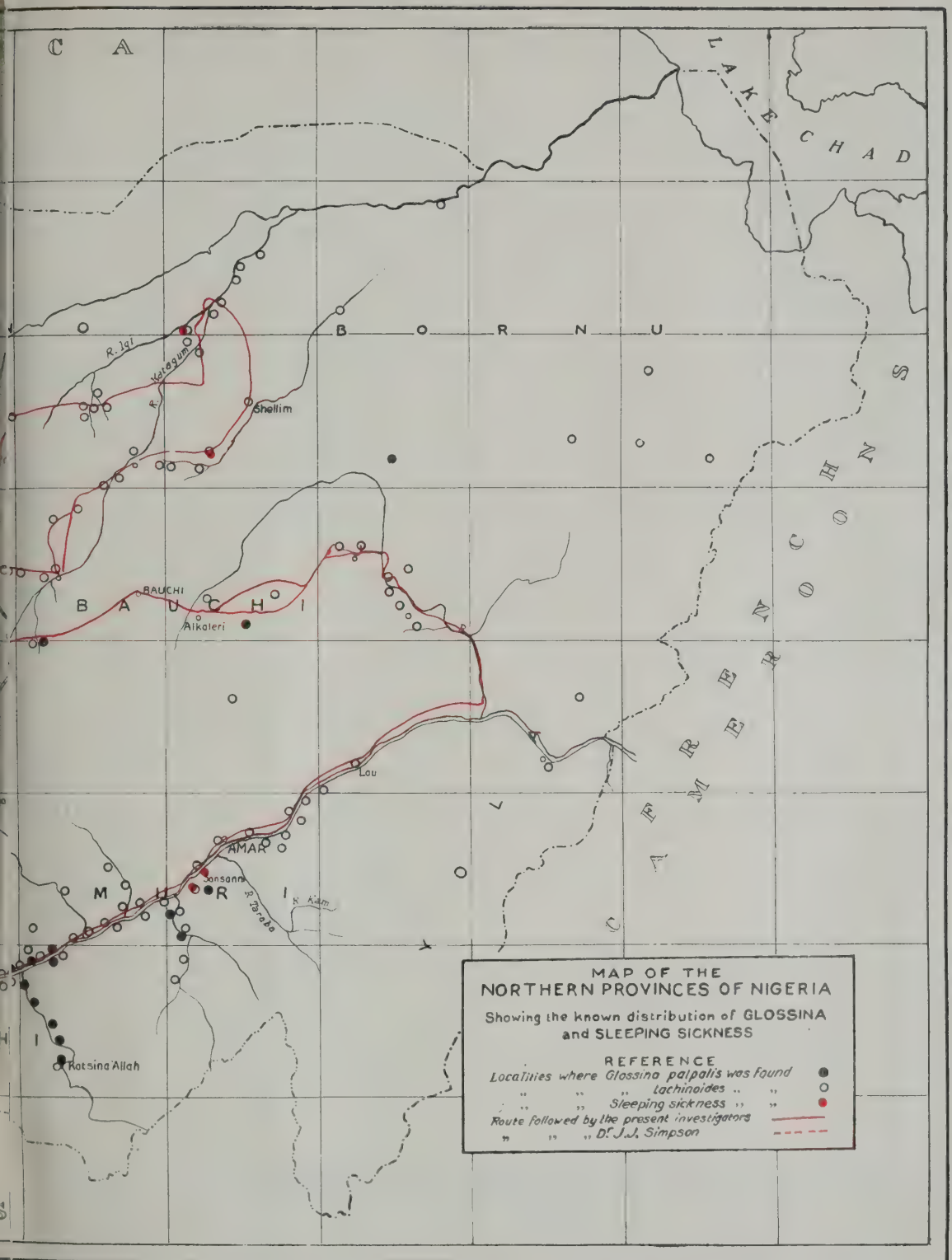
Gambaga
Tamale
Yendi
Mamprussi
Sansane Mango
Fada N'Gurma
Wagadugu
Bandiagara
Niafunke
Nioro
Walata
Arawan
Hombori
Gao
Dori
Niamey
Say
Sokoto
Gando
Kontagora
Bussa
Paraku
Lokoja
Ibadan
Abeokuta
Abomey
Atakpame
Mangache
Lome
Grand Popo
Kotonu
PORTO NOVO
LAGOS
Benin
Asaba
Forcados
Bight of Benin
Niger Delta
Akassa
Niger
Benue
Kaolak
Matam
Podor
Thies
Luga
Bakel
Kita
Siguiri
Labe
Timbo
Falaba
Pendembu
Bafulabe
Maka Colibentan
Gambia
Black Volta
White Volta
Mard.
French
Jebba
Rabba
Bida
Horin
Lafia
Kano
Zaria
Sokoto
Katsina
Bauchi
Yola
Lake Chad
Bornu
Kano
Zaria
Kontagora
Nupe
Ilorin
Oyo
Ife
Ijebu
Lagos
Abeokuta
Ibadan
Abomey
Porto Novo
Cotonou
Grand Popo
Lome
Accra
Cape Coast Castle
Sekondi
Tarkwa
Asinie
Grand Bassam
Abidjan
Bingerville
Sassandra
Grand Lahou
Greenville
Grand Bassa
Monrovia
Sherbro
Freetown
Conakry
Bissagos Is
Bolama
Port. Guinea
Bathurst
Dakar
St Louis
Senegal
Podor
Matam
Luga
Thies
Bakel
Kayes
Kaolak
Maka Colibentan
Gambia
Bafulabe
Kita
Bamako
Siguiri
Labe
Timbo
Falaba
Kissidugu
Kamabai
Bandajuma
Pendembu
Sherbro
Grand Bassa
Greenville
Sassandra
Grand Lahou
Abidjan
Bingerville
Grand Bassam
Assinie
Cape Three Points
Sekondi
Tarkwa
Cape Coast Castle
Accra
Coomassie
Kintampo
Buake
Kong
Beyla
Bodienne
Wa
Gambaga
Tamale
Yendi
Mamprussi
Sansane Mango
Fada N'Gurma
Wagadugu
Bandiagara
Niafunke
Nioro
Walata
Arawan
Hombori
Gao
Dori
Niamey
Say
Sokoto
Gando
Kontagora
Bussa
Paraku
Lokoja
Ibadan
Abeokuta
Abomey
Atakpame
Mangache
Lome
Grand Popo
Kotonu
Porto Novo
Lagos
Benin
Asaba
Forcados
Bight of Benin
Niger Delta
Akassa
Niger
Benue
Kaolak
Matam
Podor
Thies
Luga
Bakel
Kita
Siguiri
Labe
Timbo
Falaba
Kissidugu
Kamabai
Bandajuma
Pendembu
Sherbro
Grand Bassa
Greenville
Sassandra
Grand Lahou
Abidjan
Bingerville
Grand Bassam
Assinie
Cape Three Points
Sekondi
Tarkwa
Cape Coast Castle
Accra
Coomassie
Kintampo
Buake
Kong
Beyla
Bodienne
Wa
Gambaga
Tamale
Yendi
Mamprussi
Sansane Mango
Fada N'Gurma
Wagadugu
Bandiagara
Niafunke
Nioro
Walata
Arawan
Hombori
Gao
Dori
Niamey
Say
Sokoto
Gando
Kontagora
Bussa
Paraku
Lokoja
Ibadan
Abeokuta
Abomey
Atakpame
Mangache
Lome
Grand Popo
Kotonu
Porto Novo
Lagos
Benin
Asaba
Forcados
Bight of Benin
Niger Delta
Akassa
Niger
Benue
100 0 100 200 300 Kd

Carte B


FRENCH WEST AF
DAHOMEY
SOKOTO
SOKOTO
Ruma
Zurmi
Ummado
Kotorkoshi
Kwambana
ZARIA
ZARI
KADUNA
KONTAGORA
BUSSA
R. Kontagora
Tegina
Serikin Pawa
PROPOSED
R. Kaduna
ZUNGERU
JEBBA
RIVER NIGER
NASSARA
KEFFI
Egga
ILORIN
KABBA
Kabba
LOKOJA
ITOBE
SOUTHERN PROVINCES
30 20 10 0 50 100 150 200 Miles

Map B

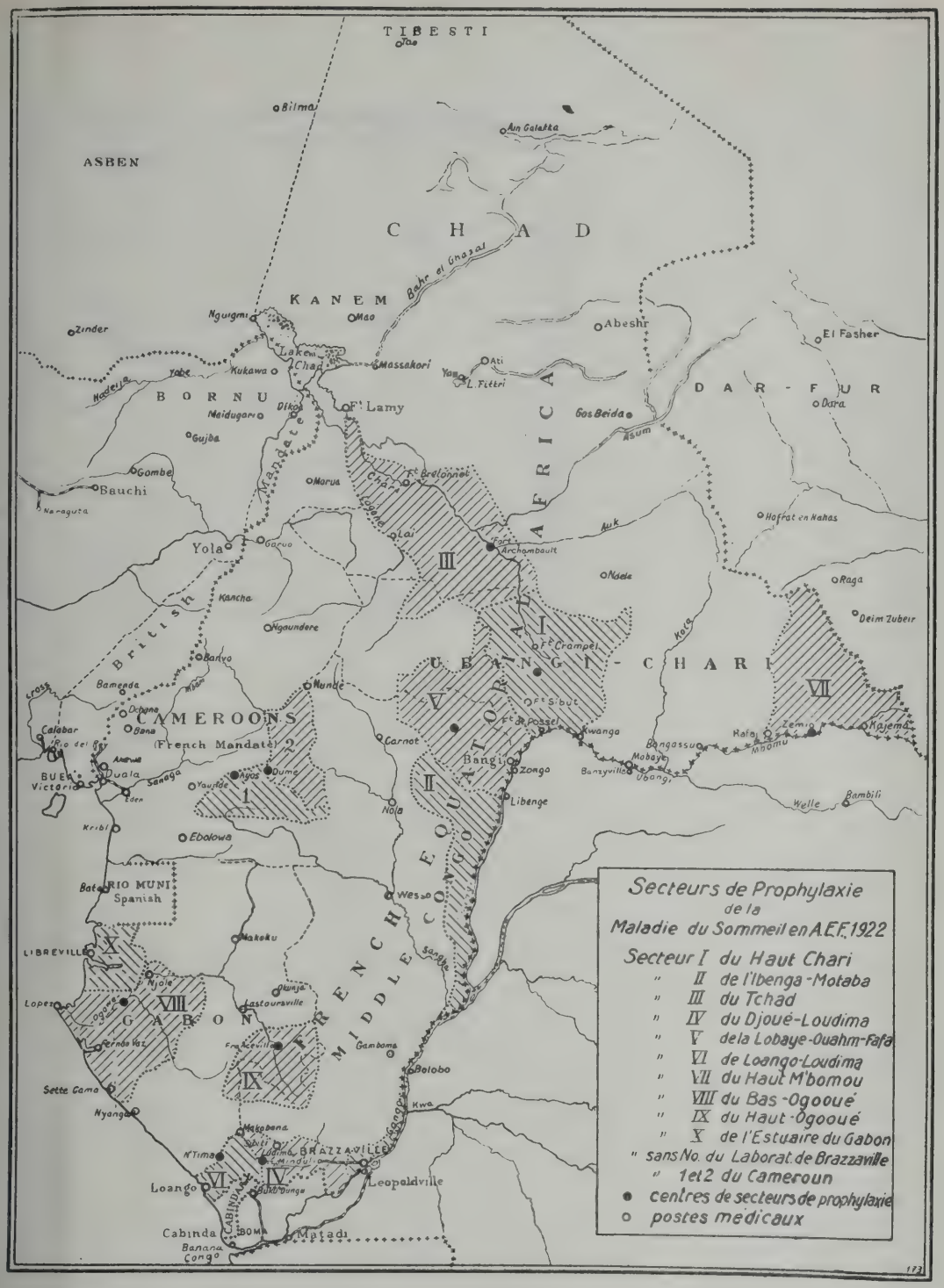

C A
LAKE CHAD
B O R N U
Shellim
BAUCHI
B A U C H I
Alkaleri
Lou
AMAR
Katsina Allah
MAP OF THE
NORTHERN PROVINCES OF NIGERIA
Showing the known distribution of GLOSSINA and SLEEPING SICKNESS
REFERENCE
Localities where Glossina palpalis was found
" " " Tachinoides " "
" " " Sleeping sickness " "
Route followed by the present investigators
" " " Dr J.J. Simpson

CARTE
MAP C

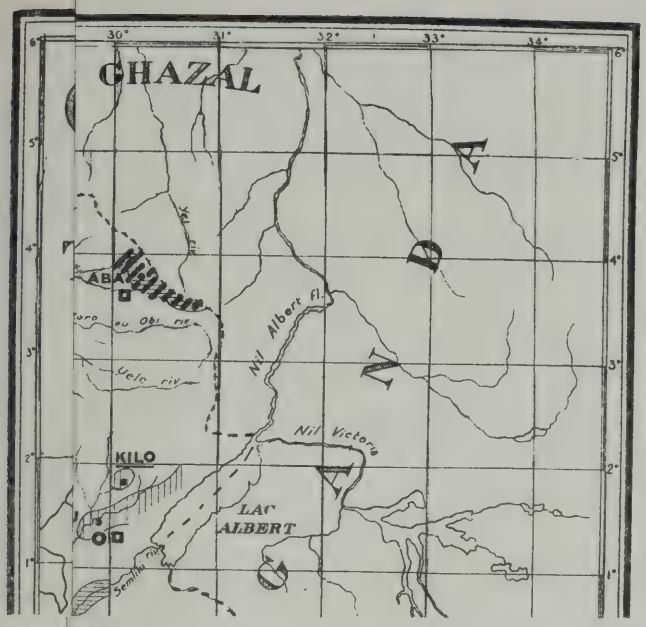
Archiv für Schiffs- und Tropen-Hygiene Bd 16 1912 Beiheft 4

KAMERUN
1:5000000
Erklärungen:
Die Bezirksämter, Residenturen und Militärstationen sind unterstrichen, die Regierungsstationen, Residentur- und Militärposten sind unterstrichelt.
Landesgrenze, Bezirksgrenzen,
fertige, im Bau befindliche, projektierte Eisenbahn,
Hauptwege, Kabel, Telegraph, Postanstalt, Botenpost.
Grenze der Schiffbarkeit auf den Hauptflüssen.
Dampfschiffverbindungen nach Kamerun:
Woermann-Linie, Hamburg-Amerika Linie,
Hamburg-Bremer-Afrika Linie (Monatlich 2 Mal.)
British and African Steam Navigation Cy. und
African Steam Ship Cy. (Alle 4 Wochen)
BUEA
UND UMGEGEND
1:2500000
1:3000000
Östl. L. 14° v. Greenw.
Red v. P. Sprigade u. M. Moisel.
Geographische Verlagshandlung DIETRICH REIMER (ERNST VOHSEN) Berlin
VERBREITUNG DER SCHLAFKRANKHEIT IN KAMERUN.
Herde mit starker Verbreitung
schwacher
zweifelhafter

Carte D
Map D



Carte C se trouve dans la poche de la couverture.
Map C is placed in the pocket of cover.


30°
31°
32°
33°
34°
6°
5°
4°
3°
2°
1°
GHAZAL
ABA
Nil Albert fl.
Nil Victoria
KILO
LAC
ALBERT

CONGO BELGE

DISPERSION DE LA TRYPANOSE HUMAINE AU 1er OCTOBRE 1922

Echelle : 1/8000000

0 50 100 200 300 400 Kilom

AFRIQUE ÉQUATORIALE FRANÇAISE

BAHR EL GHAZAL

OUGANDA

AFRIQUE ORIENTALE ALLEMANDE

OCÉAN ATLANTIQUE

ANGOLA

RHODESIE NYASALAND

YAKOMA, BAMBILI, NIANGARA, DUNGU, IBEMBO, BUTA, BOKULA, MONVEDA, LISALA, YAHILA, MAPALMA, BASALI, BASOKO, BARUMBU, YAMBUYA, AVAKUBI, KILO, TRUMU, LAC ALBERT, BENI, LAC ALBERT-EDOUARD, LAC VICTORIA, Nle ANVERS, B. SANKURU, COQUILHATVILLE, IHEDU, STANLEYVILLE, Ponthierville, KIRUNDU, LUBUTU, RUTSHURU, ALUTA, GOMA, INONGO, LOKANDU, NYA LUKEMBA, FUNDI SADI, TERRIT DU RUANDA URUNDI, UVIRA, KASONGO, LUSAMBO, Kongolo, LULUABOURG, KABINDA, ANKORO, KIAMBI, BAUDOUINVILLE, LÉOPOLDVILLE, LUKULA, IJUKU, MATADI, THYSVILLE, POPOKABAKA, BANANA, BOMA, PWETO, LUKONZOLWA, LAC MOERO, LINDABIABO, KARIBI, BUNKEYA, KAMBOVE, LAC BANGWELO, LAC NYASA

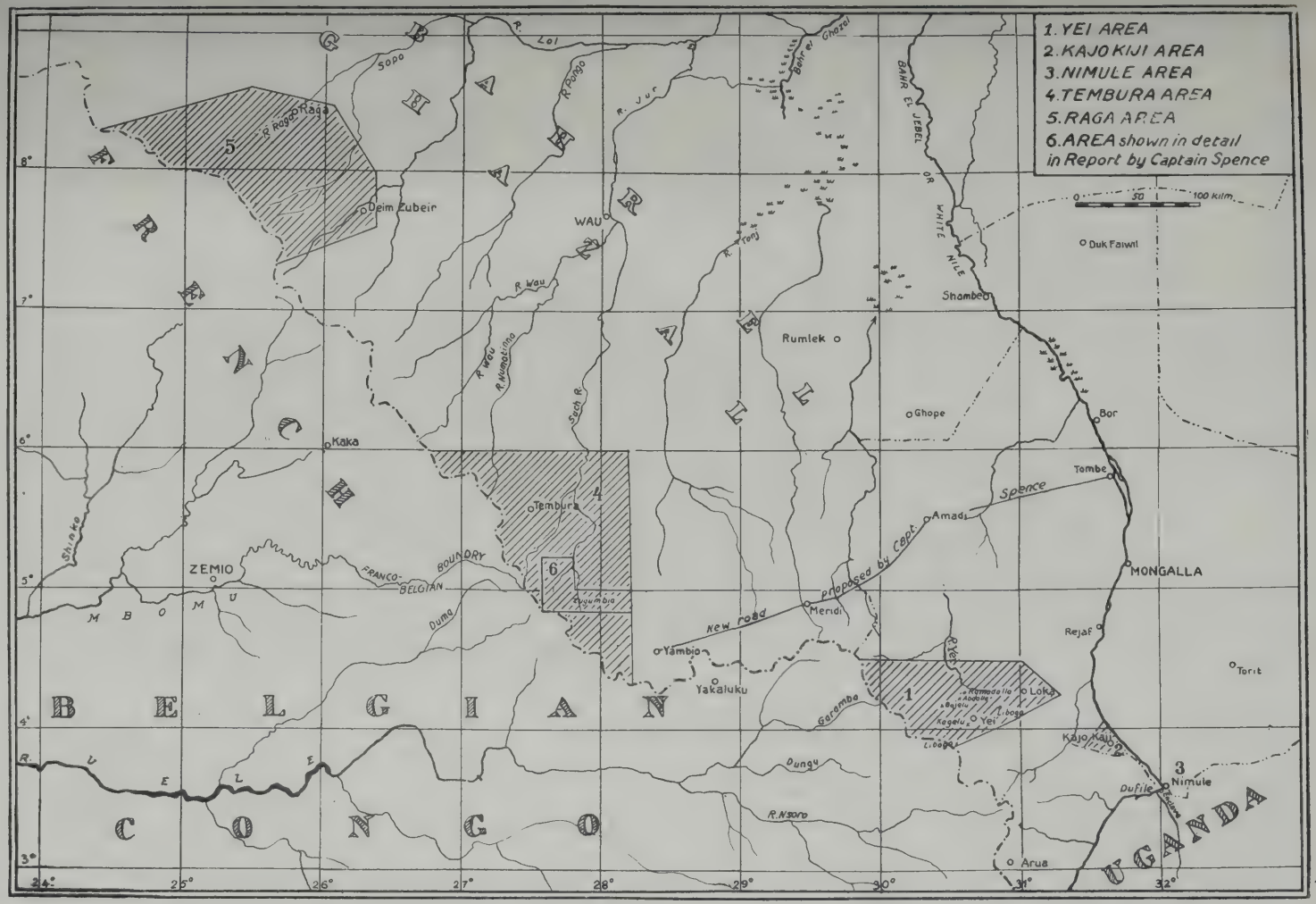
LÉGENDE

- Hôpital pour Blancs.
- ,, ,, Noirs.
- Lazaret dirigé par le Médecin territorial.
- ,, ,, ,, un ,, spécial.
- ,, ,, ,, deux Médecins spéc.
- Poste d'observation surveillé par un Blanc.
- ,, ,, ,, ,, Médecin.
- Résidence d'un Médecin territorial.
- ,, de deux Médecins territoriaux.
- Zones dans lesquelles des cas de maladie ont été constatés.
- Zones dans lesquelles de nombreux cas ont été constatés.
- Zones dans lesquelles la maladie règne à l'état grave.

REGRESSION

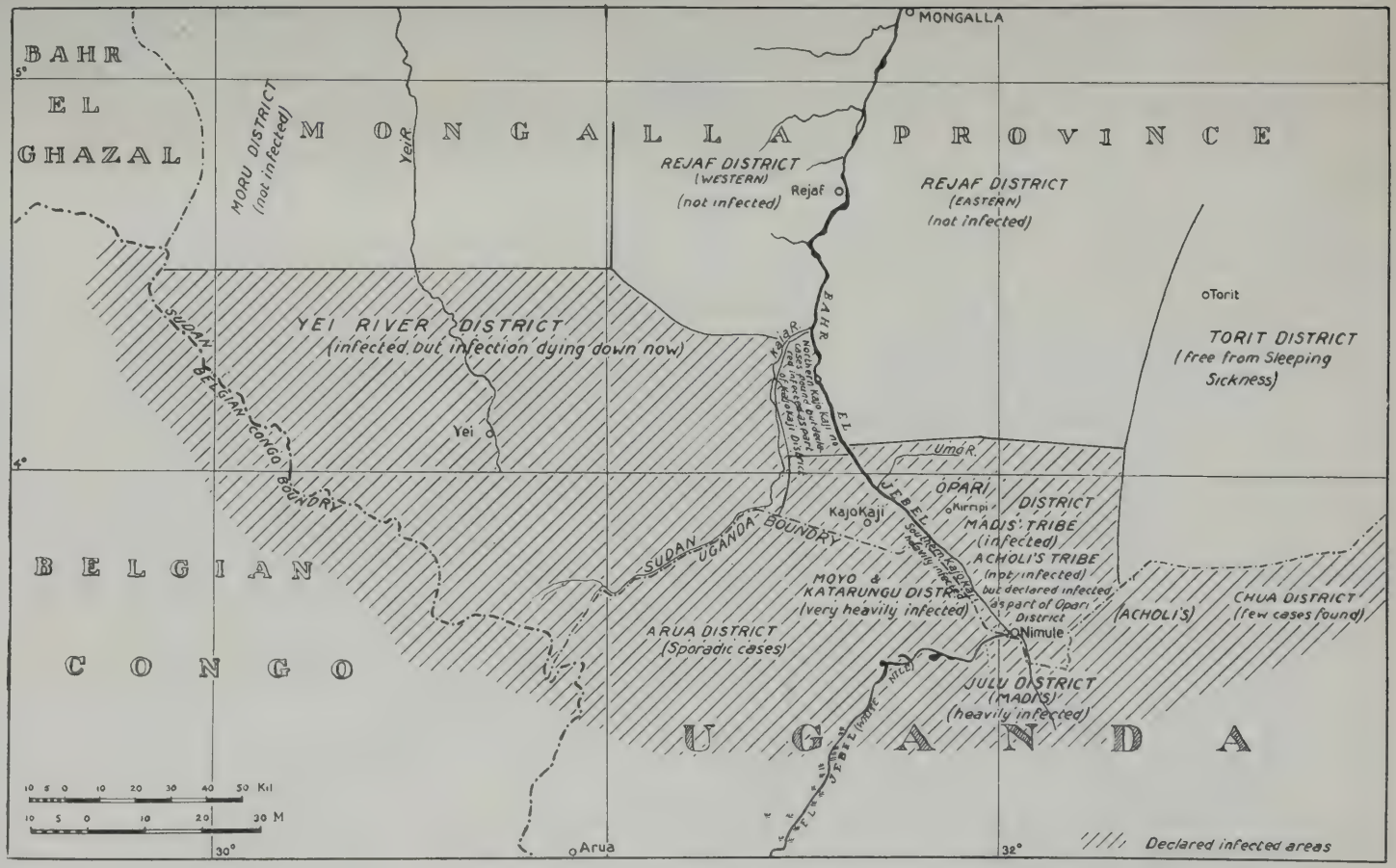
AGGRAVATION

MAP E is placed in the pocket of cover.



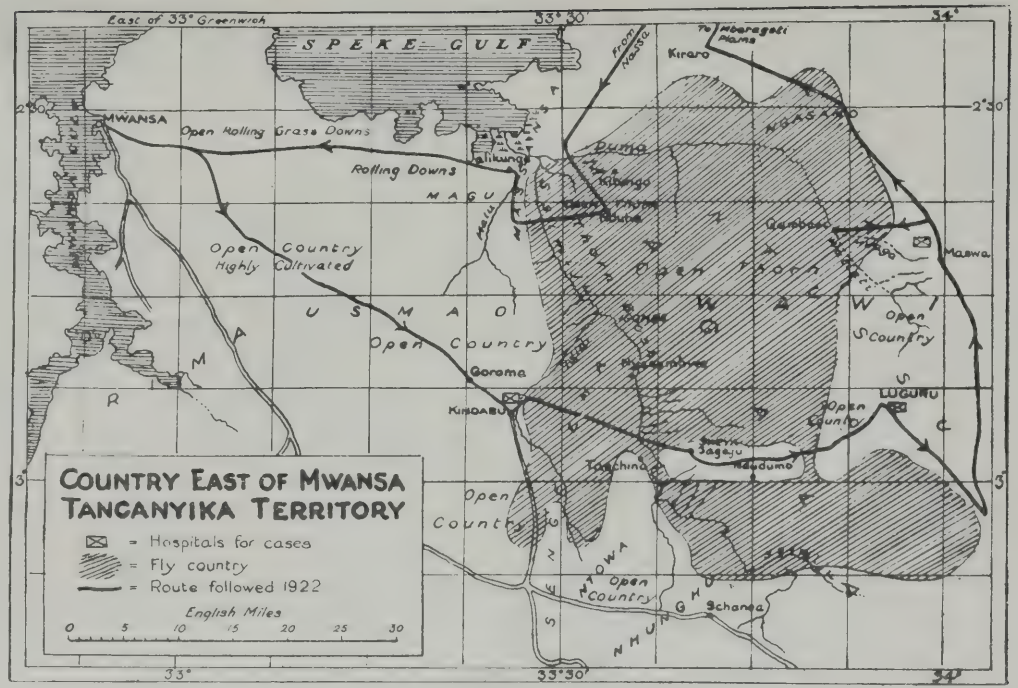
CARTE
MAP F

CARTE G
MAP

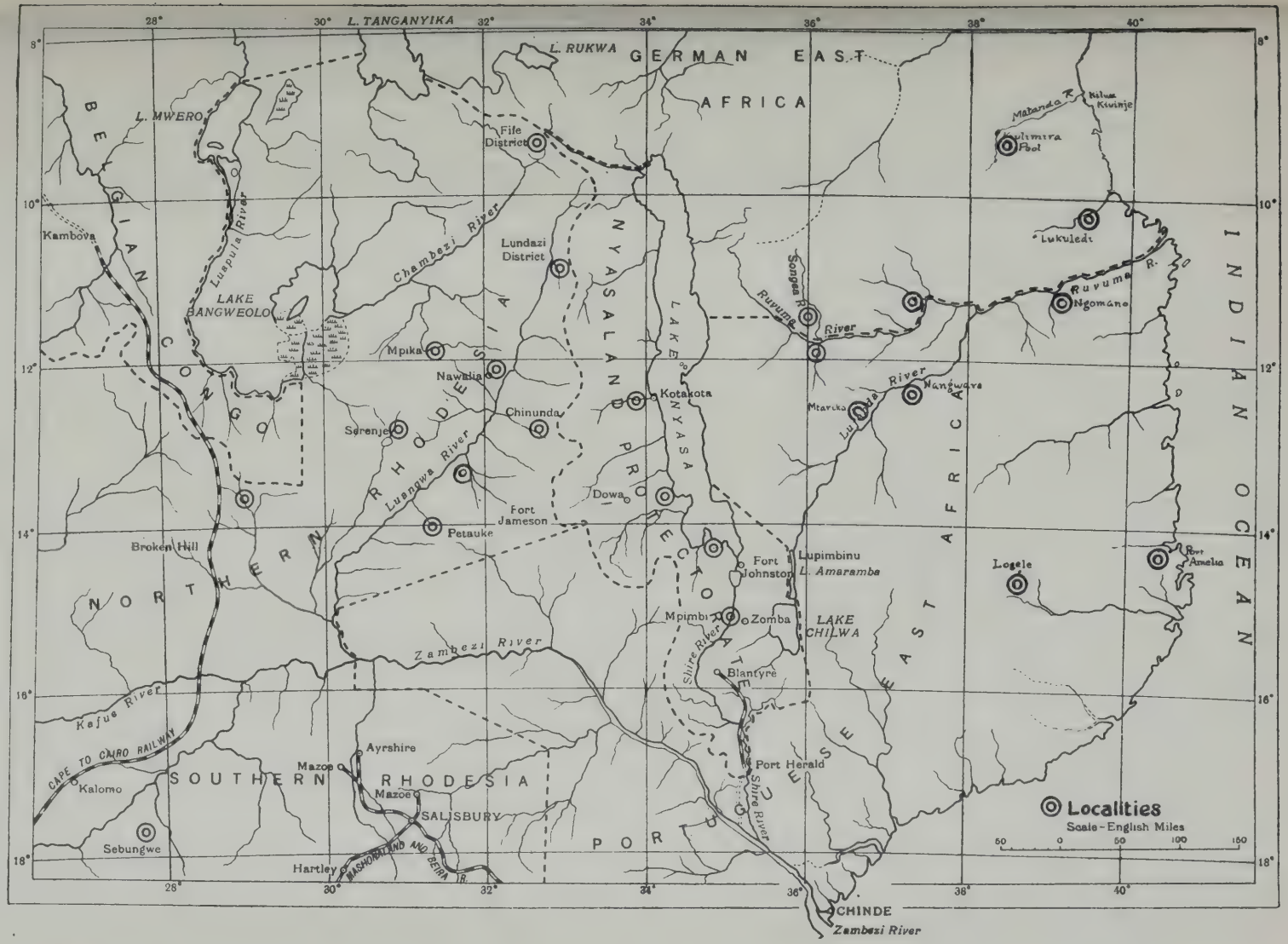

MONGALLA
BAHR EL GHAZAL
MORU DISTRICT (not infected)
YEI R.
MONGALLA PROVINCE
REJAF DISTRICT (WESTERN) (not infected)
Rejaf
REJAF DISTRICT (EASTERN) (not infected)
Torit
TORIT DISTRICT (free from Sleeping Sickness)
BAHR EL JEBEL
KAJO KAJI DISTRICT
YEI RIVER DISTRICT (infected but infection dying down now)
SUDAN BELGIAN CONGO BOUNDRY
Yei
UMA R.
OPARI DISTRICT
Kirimpi
MADI'S TRIBE (infected)
ACHOLI'S TRIBE (not infected but declared infected as part of Opari District)
Kajo Kaji
SUDAN UGANDA BOUNDRY
MOYO & KATARUNGU DISTRICT (very heavily infected)
ARUA DISTRICT (Sporadic cases)
Nimule
(ACHOLI'S)
CHUA DISTRICT (few cases found)
JULU DISTRICT (MADI'S) (heavily infected)
BELGIAN CONGO
UGANDA
WHITE NILE
Arua
5°
4°
30°
32°
10 5 0 10 20 30 40 50 Kil
10 5 0 10 20 30 M
Declared infected areas

CARTE H
MAP

Sleeping Sickness Areas completely closed
Sleeping Sickness Areas Inhabited under permit
Sleeping Sickness present in 1923
UGANDA PROTECTORATE
EASTERN PROVINCE
NORTHERN PROVINCE
WESTERN PROVINCE
RUANDA
URUNDI
BELGIAN CONGO
TURKWEL
DABOSSA
NORTH KAVIRONDO
SOUTH KAVIRONDO
MASAKA
MUBENDI
TORO
ANKOLE
KIGEZI
CHUA
LANGO
NILE
Gulu
Masindi
Fort Portal
Mbarara
Kampala
Entebbe
Jinja
Kisumu
Kericho
Eldoret
Kapsabet
Mumias
Kabale
Ruanda
Kisenyi
Usumbura
Albertville
Ujiji
Kigoma
Kasanga
Abercorn
Mpulungu
Fife
Mpika
Kasama
Ndola
Broken Hill
Kasempa
Mwinilunga
Solwezi
Kasaba
Kawambwa
Fort Jameson
Lundazi
Petauke
Chipata
Feira
Luangwa
Lusaka
Mazabuka
Monze
Choma
Kalomo
Livingstone
Sesheke
Kazungula
Kafue
Kalomo
Namwala
Mumbwa
Kabwe
Broken Hill
Ndola
Kitwe
Chingola
Mufulira
Luanshya
Chambeshi
Kasama
Mpika
Chinsali
Isoka
Nakonde
Abercorn
Mpulungu
Fife
Kasaba
Kawambwa
Fort Jameson
Lundazi
Petauke
Chipata
Feira
Luangwa
Lusaka
Mazabuka
Monze
Choma
Kalomo
Livingstone
Sesheke
Kazungula
Kafue
Namwala
Mumbwa
Kabwe
Broken Hill
Ndola
Kitwe
Chingola
Mufulira
Luanshya
Chambeshi
Kasama
Mpika
Chinsali
Isoka
Nakonde
29°
30°
31°
32°
33°
34°
35°
1°
2°
3°

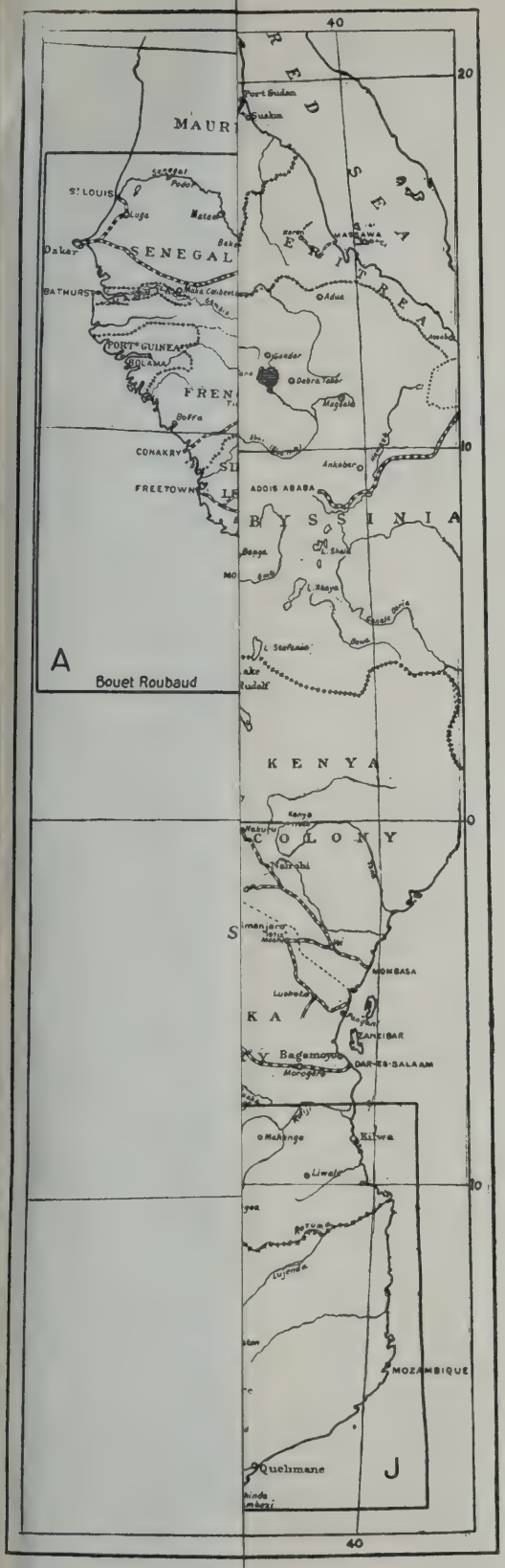

East of 33° Greenwich
33°30'
34°
SPEKE GULF
From Nassa
To Mbarangati Plains
Kiraro
MWANSA
Open Rolling Grass Downs
2°30'
Rolling Downs
Burma
Kibonga
Ilikunga
MAGU
Open Country Highly Cultivated
Ibuta
Maswa
Open Country
Gorome
Kisoabu
LUGURU
Open Country
Tinchina
Ndudumo
Open Country
Schanga
33°
35°30'
34°
COUNTRY EAST OF MWANSA
TANCANYIKA TERRITORY
= Hospitals for cases
= Fly country
= Route followed 1922
English Miles
0 5 10 15 20 25 30

CARTE I
MAP


L. TANGANYIKA
L. RUKWA
GERMAN EAST AFRICA
L. MWERO
BELGIAN CONGO
Luapula River
Fife District
Kambova
LAKE BANGWEOLO
Chambezi River
Lundazi District
NYASALAND PROTECTORATE
LAKE NYASA
Songea
Ruvuma R.
River
Ruvuma R.
Ngoman
Lukuledi
Malanda R.
Kilwa Kivinje
Mpika
Nawalia
Kotakota
Mtarika
Lujenda River
Nangwere
Serenje
Chinunda
RHODESIA
Luangwa River
Dowa
Fort Jameson
Petauke
Broken Hill
NORTHERN
Fort Johnston
Lupimbinu
L. Amarambe
Logele
Fort Amelia
Mpimbi
Zomba
LAKE CHILWA
Zambezi River
Shire River
Blantyre
Kafue River
CAPE TO CAIRO RAILWAY
Ayrshire
Mazoe
Port Herald
Kalomo
SOUTHERN RHODESIA
Mazoe
SALISBURY
Shire River
PORTUGUESE EAST AFRICA
Sebungwe
Hartley
MASHONALAND AND BEIRA R.
INDIAN OCEAN
CHINDE
Zambezi River
Localities
Scale - English Miles
50 0 50 100 150
28° 30° 32° 34° 36° 38° 40°
8° 10° 12° 14° 16° 18°

La Carte générale pour références se trouve dans la poche de la couverture, ainsi que celle indiquant la *Distribution de la Maladie du Sommeil en Afrique équatoriale.*

The *Index Map* and the *Map of Equatorial Africa showing the Distribution of Sleeping Sickness* are placed in the pocket of cover.


40
20
0
10
30
RED SEA
MAURI
Port Sudan
Suakin
St. LOUIS
Dakar
SENEGAL
BATHURST
PORT. GUINEA
FREN
CONAKRY
FREETOWN
MASSAWA
ERITREA
Adua
Ankober
ADDIS ABABA
BYSSINIA
L. Stefanie
A
Bouet Roubaud
KENYA
COLONY
Nairobi
MOMBASA
ZANZIBAR
DAR-ES-SALAAM
Bagamoyo
Kilwa
Lindi
MOZAMBIQUE
Quelimane
J
40

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FRENCH WEST AFRICA
FRENCH SUDAN
SENEGAL
FRENCH GUINEA
PORT GUINEA
SIERRA LEONE
LIBERIA
IVORY COAST
GOLD COAST
TOGO
DAHOMEY
UPPER VOLTA
NIGERIA
TERRITORY OF NIGER
CHAD
CAMEROONS (French Mandate)
GABON
FRENCH MIDDLE CONGO
UBANGI-CHARI
BELGIAN CONGO
ANGOLA
SOUTHERN RHODESIA
NORTHERN RHODESIA
NYASALAND
TANGANYIKA TERRITORY
UGANDA PROTECTORATE
KENYA COLONY
ANGLO-EGYPTIAN SUDAN
ABYSSINIA
ERITREA
RED SEA
GULF OF GUINEA
SOUTH ATLANTIC OCEAN
Bight of Benin
Bight of Biafra
Timbuktu
Bamako
Kayes
Niamey
Sokoto
Yola
Abeokuta
Freetown
Monrovia
Accra
Lagos
Libreville
Brazzaville
Leopoldville
Stanleyville
Elisabethville
Luanda
Lobito
Benguela
Mossamedes
Lusaka
Salisbury
Blantyre
Beira
Quelimane
Zambesi
Port Herald
Fort Jameson
Broken Hill
Livingstone
Victoria Falls
Zumbo
Tete
Mozambique
Nairobi
Mombasa
Zanzibar
Dar-es-Salaam
Kilimanjaro
Victoria Nyanza
Lake Albert
Lake Rudolf
Lake Tanganyika
Lake Nyasa
Khartoum
Omdurman
Port Sudan
Suakin
Massawa
Asmara
Addis Ababa
Ankober
Debra Tabor
Lake Tsana
Gondar
Fashoda
Wadelai
Bahr el Ghazal
Bahr el Abiad
Bahr el Arab
Bahr el Ghazal (river)
Darfur
Kordofan
Obeid
El Fasher
Abeshr
Kabkabia
Geneina
Fort Lamy
Fort Archambault
Fort Crampel
Fort de Possel
Bangui
Zemio
Yakoma
Buta
Aruwimi
Ituri
Lado
Wadelai
Rejaf on Bahr el Jebel
Nasser
Kodok
Ankober
Lake Stefanie
Lake Rudolf
Kisumu
Eldoret
Nakuru
Nyanza
Kisumu
Kilimanjaro
Moshi
Arusha
Tanga
Mombasa
Zanzibar
Dar-es-Salaam
Bagamoyo
Kilwa
Mahenge
Tukuyu
Iringa
Songea
Lindi
Port Amelia
Beira
Quelimane
Chinde
Zambesi
Blantyre
Zomba
Fort Jameson
Broken Hill
Livingstone
Victoria Falls
Wankie
Bulawayo
Salisbury
Umtali
Beira
Port Herald
Zumbo
Tete
Mozambique
Lake Nyasa
Lake Tanganyika
Lake Mweru
Lake Bangweolo
Lake Kisale
Lake Albert
Lake Rudolf
Lake Stefanie
Lake Tsana
Lake Victoria Nyanza
Lake Kivu
Lake Edward
Lake Albert
Lake Rudolf
Lake Tanganyika
Lake Nyasa
Lake Mweru
Lake Bangweolo
Lake Kisale
Lake Tsana
Lake Victoria Nyanza
Lake Kivu
Lake Edward
Lake Albert
Lake Rudolf
Lake Stefanie

C. 167. M. 43. 1924. III
[C. H. 130]

LEAGUE OF NATIONS

THE

PREVALENCE OF EPIDEMIC DISEASE

AND

PORT HEALTH

ORGANISATION AND PROCEDURE

IN THE

FAR EAST

REPORT

PRESENTED TO

The Health Committee of The League of Nations

BY

F. NORMAN WHITE

GENEVA 1923

THE LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

Carte de l'Afrique équatoriale indiquant la distribution de la Maladie du Sommeil.
Map of Equatorial Africa showing the Distribution of Sleeping Sickness.

WA
L17C
1924

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Map showing Itinerary of Mission. . . . . *Frontispiece*

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I — INTRODUCTION

The despatch of a Mission to the Far East was the outcome of a proposal put forward by Dr. Miyajima to the Health Committee of the League of Nations at its meeting held in Geneva on the 29th of August, 1922. The Health Committee adopted the following resolution :

"The Health Committee, having considered the proposals put forward by Dr. Miyajima for the despatch of a small Commission to the Far East to collect information regarding the incidence of epidemic diseases, especially those of international importance, in important ports, and the measures taken to prevent the transmission of these diseases to other ports, recommends in principle the despatch of a Commission.

"The Health Committee appoints a Sub-Committee of three members in order to define :

"(*a*) The details of the enquiry, the objects of which are defined above; and

"(*b*) The preliminary negotiations to be undertaken, as well as to make recommendations to the Chairman of the Committee as regards the appointment of the Commissioners."

It was originally intended that the mission should consist of two or three members. In view, however, of the shortness of time available, if advantage were to be taken of the cold-weather months of 1922-1923, and of other considerations, it was not possible for the Sub-Committee to make nominations of officials or experts who could be spared from their posts for as long a period as six months, which was the original estimated duration of the enquiry. In these circumstances, the undersigned was asked to undertake the enquiry alone.

In the part of the tour that was devoted to Hong-Kong, Shanghai and parts of Japan, the writer had the good fortune to have Dr. H. F. Smith, a member of the Public Health Service of the United States, as an "unofficial" colleague on the mission of enquiry. Thanks are due to him for much valued help and advice.

The field to be covered by the enquiry was summarised as follows :

(1) The incidence of the most important epidemic diseases in the various ports of the Far East and adjacent territory during, say, the last five years, special attention being paid to those diseases of international importance, notably plague, cholera, and smallpox; the seasonal prevalence of these diseases; whether endemic or dependent on re-infection, and, if the latter, the common sources and mode of infection; and the measures in force for the notification and collection of statistics regarding cases and deaths due to such diseases.

(2) The part played by shipping in the spread of infection from port to port.

(3) The quarantine regulations and prevention of disease ordinances in force at the various ports, to include an enquiry into the manner in which such regulations are put into practice.

(4) The possibilities of making information regarding the prevalence of the chief diseases in the various ports more readily accessible to all concerned than it is at present, if possible devising a scheme for the interchange of such information.

(5) The possibilities of obtaining uniform procedure in the chief ports of the Far East with regard to quarantine regulations and port health procedure. The equipment and procedure in these ports in relation to the proposed Article 46 of the revised International Sanitary Convention of Paris was to be considered.

(6) The possibilities of obtaining the adhesion of the various countries to some form of convention regulating the subjects referred to above, or local agreements of the kind contemplated by Article 45 of the revised International Convention.

(7) The practical advantage which would result from the application of Part I of the revised Convention and the modifications, it any, which are desirable in this part to meet the requirements of the Far East.

The above paragraphs include most of the subjects which were to be considered by the mission. Without prejudice to any of the above work, it was hoped that information might be collected and obtained which would indicate lines for future epidemiological investigation of general interest.

The undersigned sailed from Marseilles on November 3rd and arrived in Penang on November 24th, 1922. From Penang he went by train to Bangkok, where, as a preliminary to the proper work of the mission, he represented the Health Organisation of the League of Nations at the Far Eastern Conference of the League of Red Cross Societies. In the following table are indicated the dates of arrival in and departure from the chief ports, towns and countries of the Far East that were visited :

	Arrival	Departure
Bangkok	28th November 1922	8th December 1922
Singapore	11th December 1922	29th December 1922
Java	31st December 1922	13th January 1923

	Arrival	Departure
Singapore	15th January 1923	22nd January 1923
Hong-Kong	27th January 1923	6th February 1923
Shanghai	9th February 1923	18th February 1923
Japan	20th February 1923	11th March 1923
Formosa	14th March 1923	17th March 1923
Korea	23rd March 1923	26th March 1923
Harbin	27th March 1923	29th March 1923
Mukden	29th March 1923	30th March 1923
Dairen	31st March 1923	2nd April 1923
Newchwang	2nd April 1923	4th April 1923
Peking	5th April 1923	9th April 1923
Shanghai	10th April 1923	13th April 1923
Manila	18th April 1923	27th April 1923
Haiphong	2nd May 1923	
Saigon		22nd May 1923
Singapore	25th May 1923	29th May 1923
Kuala Lumpur	30th May 1923	1st June 1923
Penang	1st June 1923	2nd June 1923
Rangoon	5th June 1923	9th June 1923
Calcutta	12th June 1923	15th June 1923
Simla	17th June 1923	23rd June 1923
Bombay	25th June 1923	29th June 1923
Colombo	2nd July 1923	10th July 1923
Marseilles	29th July 1923	

The total distance covered in the above itinerary was about 35,000 miles, exclusive of numerous short journeys of inspection undertaken from many of the ports. Eighteen voyages in steamships were made. The journeys from Fusan, in Korea, to Seoul, Mukden, Harbin, Dairen, Newchwang, Peking and Shanghai were made by train, as were the journeys between Penang and Bangkok, Bangkok and Singapore, Singapore and Penang, Calcutta and Simla, and Simla and Bombay. The journey through Tonking, Annam, Cochin-China and Cambodia was made by motor-car. Trains and motor-cars were used in the comprehensive tours through Java and Japan.

In spite of the fact that the tour extended over nine months, instead of the six months that was originally contemplated, the dates given above indicate that the stay in certain ports and countries was of very limited duration—too limited, in fact, to do all that the writer desired and intended to do. Certain ports in China of considerable importance from the public health point of view had to be omitted from the itinerary. Furthermore, the length of stay in certain countries had to be curtailed, and in certain ports lengthened, on account of the dates of the sailings of vessels and such-like considerations.

In spite of the rapidity of travelling and the short length of stay that was possible in certain important countries, the amount of information collected and the number of ports, hospitals, laboratories, etc., that were inspected in detail were in considerable excess of what seemed possible at the commencement of the tour. It is not pretended that the investigation was as full and detailed as one could have wished, but the cordial assistance and generous co-operation received from all the Governments concerned, and from public health officials and research workers, enabled the tour to be much more comprehensive than the dates in the itinerary indicate. This co-operation and assistance has placed the writer under a deep sense of obligation; they converted what might have been a peculiarly difficult task into one of comparative simplicity. In every port visited all available information was quickly produced and every facility was afforded for the inspection of everything of direct interest to the enquiry. The interest taken in the work of the mission evidenced a realisation almost everywhere that the success of measures designed for the control and eradication of serious epidemic disease is dependent in large measure upon international co-operation.

For all the facts and information reproduced in this somewhat voluminous report, the writer is indebted to official health publications, books and monographs, and it is much regretted that the nature of the report has made it impossible to acknowledge in all cases the source of the information.

The arrangement of this report is somewhat unusual. The earlier chapters dealing with plague in the Far East, cholera in the Far East, smallpox in the Far East, a sanitary Convention for the Far East and a Central Bureau of Epidemiological Intelligence for the Far East, are, in fact, the conclusions and results of the enquiries which have been prosecuted in the individual countries visited. These investigations are described in greater or less detail in the remaining chapters of the report. It will be noted that the reports on the various countries visited have not been drawn up on a uniform plan; in the circumstances this was unavoidable.

It was originally intended to collect information about the various ports by means of a comprehensive questionnaire, but the idea was quickly abandoned. No questionnaire that could be framed would be equally suitable and applicable to the very varied conditions found in the ports and countries of the Far East. There are special local health problems in almost every one of the ports visited, and the relative importance of these would be lost sight of by adopting the questionnaire system.

In this report much more attention is given to epidemiological facts regarding the diseases of chief international importance than was originally intended. It is obvious that no discussion of the adequacy or otherwise of port health procedure can be profitable without a

comprehensive and detailed study of the behaviour of these diseases both in the ports and in the territories adjacent. A study of these matters necessitates an appreciation of the public health and medical organisation and activities of the countries concerned. This in itself constitutes a very large subject of enquiry, as countries in all stages of public health and sanitary development are included in the Far Eastern arena.

The habits, customs and constitution of the populations of the various countries have also a direct bearing on what is possible in the field of public health procedure and disease prevention. Questions of housing, occupation and general sanitation in the ports are likewise matters of extreme importance. The enquiry, in fact, assumed more and more the nature of a general investigation into public health conditions, with special regard always to the dangers of transmitting infection by ship from country to country.

This report contains indications of the vast amount of material and information that has been accumulated. Much of this material might with advantage be worked up in much greater detail than has been possible in the time available and given the nature of the report.

It is much regretted that time did not permit of an investigation into conditions in ports on the China coast other than Hong-Kong and Shanghai. Dr. H. F. Smith visited Canton, however, on the writer's behalf, and his note on the present conditions in that port is appended to Chapter IX of the report, which deals with Hong-Kong. Enquiries of this nature in China are rendered supremely difficult by the fact that there are no vital statistics of any kind. It is to be hoped that the near future may make it possible to obtain death statistics from some important representative Chinese towns. It might be possible even now to obtain accurate information from the coffin-makers as to the number of people who die each month of the year. Such data would be of extreme interest. From a study of monthly mortality figures over a number of years it is often possible to arrive at a just appreciation of the havoc attributable to each of the more important epidemic diseases in many countries of the Far East. In certain countries each of the more important causes of mortality has a well-marked and differing seasonal prevalence, and in all countries total mortality figures serve as a useful check on the accuracy or otherwise of the system of notification of cases and deaths from communicable diseases.

While on this subject, it would be well to urge the importance of reporting the total deaths from all causes registered in the ports of the Far East during each week, in addition to the deaths caused by epidemic disease. An undue rise in the general mortality curve is very frequently the first indication that one gets of the presence of infection on an epidemic scale, and serves as a timely danger signal. Considering the Far East as a whole, the total mortality figures are the most valuable of all public health data, and in general they are the figures which are registered with the greatest degree of accuracy.

The writer is deeply conscious of the many imperfections of this report. The amount of work that its compilation has entailed has been great. Many of the detailed chapters were originally drafted during short voyages in small ships, in frequently rough seas, or in railway trains. The stay in a port or in a country was very rarely sufficiently long to permit of anything more than the roughest of notes being put together prior to departure. On arrival at the next port of call one was immediately immersed in a totally different set of problems, in strange surroundings, and almost every moment was allotted to learning as much as possible concerning the innumerable matters which come within the terms of reference, until it was time to set sail for the next port. Several of the chapters, in spite of revision, still bear the marks of too hurried compilation. A few of these have been left in large measure untouched, as they record what were recent impressions.

The above remarks are offered as an apology rather than as an excuse. They arise from the vivid realisation that the report is unworthy of the endless trouble taken by so many distinguished colleagues in the Far East to facilitate in every way possible the work of the enquiry. It is to this unstinted co-operation and assistance that the writer owes whatever may be considered worthy in this report.

In the earlier part of the tour, reports concerning individual countries or ports were sent to the Chief Health Officers concerned, with a request that attention might be drawn to such errors or misinterpretations of fact as might have found their way inadvertently into the reports. This procedure was adopted in the case of Singapore, the Dutch East Indies, Hong-Kong, Shanghai, Japan, Formosa, Korea and the Kwangtung Leased-Territory. From May onward, however, the pace of the tour became too rapid, and opportunities for writing too few to enable this procedure to be continued; this is much regretted. Care has been taken in the compilation throughout, and it is confidently hoped that if errors of fact have crept in, they are few and far between.

The fact that certain chapters were drafted with the intention of submitting them for the approval of the countries concerned is responsible for a certain amount of repetition. It was necessary to make these chapters more or less complete in themselves.

Here and there throughout the report attention is directed to what appeared to the writer to be defects, of greater or less importance, or shortcomings, in the health measures adopted. The fact that such criticisms are elaborated in much greater detail in the case of certain ports and countries than of others does not necessarily imply that the defects in question are more noteworthy there than elsewhere. It is most desirable that the chapters regarding the different countries visited should not be read with the desire of establishing a comparison of the relative efficiency, or otherwise, of the procedure in the various countries. It was not the function of the Mission to make comparisons, invidious or otherwise, between the merits of the health procedure of different countries, and it would be much regretted if anything in this report should give rise to an impression that such comparisons were intended. Even if one had had the temerity to attempt it, the task of justly awarding praise or blame would have been almost impossible. The conditions prevailing in the ports and countries of the East are incomparably different; the

resources available for public health activity are unequally distributed; what is easy of accomplishment in an advanced country of the East, or in a wealthy town or port, might be a very great achievement in other less fortunate places.

The length of the chapters devoted to countries and towns visited is sometimes very disproportionate to the importance of the town or country, either from a commercial or a public health viewpoint : this also is unavoidable. To have devoted as much attention to the more advanced countries of the East as the state of their public health development warrants would have entailed a most unwieldy report from the point of view of size, and its publication would have had to be delayed unjustifiably. On each re-reading of the proofs, fresh omissions, of greater or less importance, come to light. It is issued in its present form with the hope that the future may afford an opportunity of making good some of the more important omissions.

It may be claimed, perhaps, that the terms of reference have been fulfilled as completely as possible in the conditions in which the tour was undertaken.

A matter of very considerable interest and importance from the public health viewpoint, but one which does not come strictly within the terms of reference of the present enquiry, concerns the relationship between curative and preventive medicine in the countries of the Far East and the relationship of both to the local administrations. To have entered into a discussion of such matters in the case of the various countries visited might have had the appearance of unjustifiable interference in matters with which the writer is not directly concerned. Certain of the questions at issue are, however, of very vital importance to all engaged in the struggle against epidemic disease.

The form in which Western medicine was introduced into practically all countries in the East was, from the very nature of things, curative rather than preventive. Preventive medicine is a very modern science, and in no country of the world had its practice been much developed at the time when hospitals and Western medicine came to the assistance of the populations of the Orient. Developments have been very rapid during recent years and all the more advanced countries in the East are paying more and more attention to the prevention of disease; but in many countries specialism in preventive medicine is not as far advanced as it might be. Without any intention or desire to belittle the great good which curative medicine has done for the populations of the countries under consideration, it must be admitted that, from the point of view of administration, prevention of disease is of far greater importance than its cure, though the results are unfortunately much less obvious to the lay mind. Medicine having been introduced into the East in its curative form, it followed that such work as was done in the direction of disease prevention was, perhaps naturally, subordinated or attached to curative medicine. In several countries of the Far East this subordination has given rise to jealousies and discontent, which have had the unfortunate effect of retarding the sanitary and public health evolution of the countries concerned which all have at heart. As a country develops, curative medicine, the administration of hospitals, etc., could be, and perhaps should be, decentralised to a very large extent, but measures for the prevention of epidemic disease must be centralised and co-ordinated. The prevention of disease is an important function of every modern State, and among the huge populations of certain Oriental countries its importance is somewhat overshadowed by the justifiable amount of attention that is paid to giving relief to the suffering and sick. As a result of observations in many countries, the conclusion has been reached that progress is likely to be much more rapid if public health activities be carried out independently of curative medicine, provided, of course, that close co-operation and harmonious working be assured between the two branches of the medical profession.

Public health activities in many countries are passing through a time of extreme difficulty. In most countries of the world there is a demand for economy, which necessitates a most regrettable slowing down of public health development. It is to be hoped that the process will not entail the loss of ground already gained. In no country are there sufficient facilities for the prompt application of the results of scientific discovery and research to the prevention of disease. In most countries research is too far in advance of public health practice. In certain countries there is evidence of a definite and well-marked continuous rise in the total mortality curve that has been attendant upon increase in commercial and economic prosperity. Railways and other means of rapid communication signify increased facilities for the rapid transmission of infection of communicable disease unless public health organisation be developed at a corresponding rate. Many countries in the Far East, and elsewhere, are much too poor at the present time to be able to afford the luxury of economy in matters pertaining to the prevention of disease. The eradication of epidemics is a much more costly undertaking than is their prevention.

As this report is going to press, a copy of the resolutions that were adopted by the Far East Association of Tropical Medicine at its Fifth Congress, which was held in Singapore from September 3 to 17, 1923, has been received. Certain of these resolutions have a direct bearing on the subject of the present enquiry.

The subject of port quarantine procedure came under discussion and on the 8th September the following resolutions were adopted :

"(1) The regulations of the International Convention of Paris, 1912, are not suitable for the proper carrying out of quarantine measures in the Far East.

"(2) The alterations so far proposed by the Office international d'Hygiene publique and the Office of Hygiene of the League of Nations do not alter this unsuitability.

"(3) That circumstances in the Far East demand a quite different quarantine procedure from that in Europe. It is therefore desirable that a separate agreement should be drawn up to govern quarantine regulations in the Far East to allow of the necessary co-operation between the different Far Eastern countries. It is also agreed that a copy of this resolution be sent to all Governments of the Far East and the Office of the Health

Committee of the League of Nations at Geneva and the Office international d'Hygiene publique at Paris."

The reference in paragraph 2 of the above resolution to the Health Organisation of the League of Nations apparently relates to the proposals that have been put forward regarding the revision of those parts of the International Sanitary Convention of Paris which deal with the Mecca Pilgrimage.

The Congress also considered, at the writer's request, the best means for applying the system of interchange of sanitary personnel, which has been initiated by the Health Organisation of the League of Nations, to conditions in the Far East. The following resolution was adopted :

"That this Association requests the Health Committee of the League of Nations :

"(*a*) To arrange for the temporary interchange of sanitary personnel in countries of the Far East;

"(*b*) In this connection to provide for a course of instruction for health officers to be given in Tokyo following the meeting of the Sixth Congress."

During the course of the tour instructions were received by the writer to study the possibility, should occasion offer, of arriving at some international agreement controlling the export and import of polished rice, with a view to effecting a reduction or elimination of beri-beri from the rice-eating countries of the Far East. The matter was discussed in many countries and the conclusion was reached that at the present time there was insufficient unanimity of opinion amongst research workers, and others, especially in countries where the question is one of first-class commercial importance, to enable an agreement to be negotiated. Moreover, the subject was down for discussion by the Fifth Congress of the Far Eastern Association of Tropical Medicine and it was thought advisable to leave the matter pending the result of the deliberations of this body. The resolutions on this subject adopted by the Congress are as follows :

"The Fifth Congress of the Far Eastern Association of Tropical Medicine has considered the proposal of the Philippine Islands delegation for international action in the control of beri-beri and has taken note of the views of the Governments represented in the Fifth Congress. The Association is of opinion that, consequent upon the divergence of views disclosed in the statements of the official delegates, any international convention is at present impracticable.

"The Association reaffirms its belief that beri-beri is a disorder of nutrition and that in the Far East the principal factor in its causation is a diet of which over-milled rice forms the staple.

"The Association recommends that individual Governments be invited to promote further research into the following questions in relation to beri-beri control :

"(*a*) The standardisation of rice;

"(*b*) The effects of transport and storage on rice;

"(*c*) Economical considerations.

"The Association recommends that each of the Governments interested and the Rockefeller Foundation be invited to nominate a representative to a Committee for beri-beri, which shall report at the next Congress.

"The Association considers that in the meantime individual Governments should take such action for the control of beri-beri as may be suited to local conditions in their respective countries, and should devote special attention to devising and applying practical methods of improving the diet of the general population with regard to the too exclusive use of over-milled rice, and be requested to make available to the next Congress of the Far Eastern Association of Tropical Medicine systematic observations and statistical data showing the results of those methods.

"The Association considers that educational methods of control on the basis of the available scientific knowledge should be vigorously applied in all countries."

The suggestion that a representative of the Health Committee of the League of Nations should be on the suggested Committee met with universal approval.

A further reference to the Far Eastern Association of Tropical Medicine and its activities will be found in Chapter VI of this report, which deals with the subject of a Central International Epidemiological Intelligence Bureau for the Far East.

To all the Governments and administrations of the countries in the Far East visited, the most sincere thanks and acknowledgements of the writer are due for the facilities afforded for the prosecution of the enquiry, for much generous hospitality, and for the sympathetic attitude which was, almost without exception, adopted towards the enquiry. It is not possible to mention by name all of the distinguished colleagues in the Far East who have done so much to ensure such degree of success as can be claimed for the investigation. The writer is particularly indebted to :

In *Siam*, H.R.H. the Director of Public Health and his expert adviser, Dr. Ayer, and Dr. Mendelsohn, the Medical Officer of Health of Bangkok : in *Singapore*, Dr. Hoops, the principal Civil Medical Officer, Drs. Glennie and Hunter, of the Singapore Municipality, and Dr. Gilbert Brooke, Chief Health Officer and Port Health Officer of Singapore, whose knowledge and experience in his special subject have been of priceless value : in the *Dutch East Indies*, Dr. Lonkhuysen, the principal Medical Officer, Dr. Versteeg, the chief plague Medical Officer, and Dr. von Romer : in *Hong-Kong*, Dr. Jonhson, the principal Medical Officer, and Dr. Pearse, the Medical Officer of Health :

in *Shanghai,* Dr. Noel Davis, the administrative Medical Officer of the Shanghai Municipal Council : in *Japan,* Dr. Uchino, in whose company the Japanese tour was undertaken, and Dr. Miyajima, who accompanied the Mission throughout the tours in Formosa, Korea and South Manchuria : in *Formosa,* Dr. Horiutchi, Dr. Kuraoka, and Dr. Hatori : in *Korea,* Professor Shiga, who accompanied the writer as far north as Harbin, and Dr. Tsurumi, Chief Health Officer of the South Manchurian Railway, who was with the writer throughout the tour in Korea and Manchuria : in *China,* Dr. Wu Lien Teh and his colleagues of the North Manchurian Plague Prevention Service, and Dr. Chen; Dr. Wu Lien Teh was with the writer from Seoul in Korea until his departure from Peking : in the *Philippine Islands,* Dr. Smith and Colonel Munson : in *French Indo-China,* Médecin principal (1re classe) Oudibert, Inspecteur-général des Services sanitaires et médicaux de l'Indo-Chine, Dr. Asselin, who accompanied the writer throughout the motor tour in Tonking, Annam, Cochin-China and Cambodia, Dr. Roy des Barres, Dr. Yersin, Director of the Nhatrang Pasteur Institute, Dr. Lherminier, the Director of Health of Cochin-China, Dr. Marzin, and Dr. Noel Bernard, the Director of the Pasteur Institute of Saigon : in the *Federated Malay States,* Dr. Wellington, the Chief Health Officer : in *Burma,* Lieut.-Colonel Bissett, the Director of Health : in *Bengal,* Dr. Bentley, the Director of Health : in *India,* Lieut.-Colonel Hutchinson, the Health Commissioner with the Government of India : and in *Ceylon,* Dr. Rutherford, the principal Civil Medical Officer, and Dr. Marshall Phillip, Medical Officer of Health of Colombo.

To all these and the many others who have rendered much valued assistance, the writer desires to express his heartfelt thanks, and to pay his respectful tribute to the work which has made their names so well known in the Public Health world of the East.

F. NORMAN WHITE.

II — PLAGUE IN THE FAR EAST

The pandemic of plague from which the Far East is still suffering may be said to have commenced in 1894, when the disease made its dramatic appearance in Hong-Kong. It is hardly possible here to refer to the considerable literature concerning the source of Hong-Kong's infection, etc., but in the sections of this report devoted to the countries visited, the evolution of the disease in each of these countries which has been infected since that date has been discussed and described, sometimes at very considerable length.

Scope of this Section of the Report.

In this part of the report it is proposed to condense into as small space as is compatible with clearness some of the more important epidemiological facts which emerge from a study of the history of the disease in the Far East, as a whole, during the past 25 years; to emphasise such facts as are of chief importance from the practical point of view and to study their applicability to the framing of measures for the control or reduction of the disease in conditions actually prevailing in the East; to summarise the present plague situation in the East, and to say something with regard to prospects for the future. It is realised that this programme is an ambitious one; its execution is difficult, not least on account of the wealth of material that there is at one's command.

It is regretted that the nature of this report renders it impossible to specify by name all the many distinguished authors of reports and monographs to whom the writer is indebted for most valuable information, and the numerous eminent scientists and public-health officials who have assisted so generously in the work of the enquiry.

Importance of Plague.

It is hardly necessary to refer at length to the importance of plague as a disease; considerable space would be required for the adequate treatment of this subject. It is not only the millions of lives that have been sacrificed to plague during the past quarter of a century that give to plague its sinister importance; its economic importance is also very considerable. *Inter alia,* the disorganisation of trade and commerce for which plague has been responsible during this period of time probably exceeds in amount that which can be attributed to any other epidemic disease.

In writing of this aspect of the question it would be unjust to suppress reference to the credit side of the account. The sudden appearance of epidemic plague in the closing years of the last century was a much-needed stimulus to public-health activity in many countries. The sudden appearance of an epidemic disease on so large a scale—almost an unknown disease to the then existing generation of medical men, and one as to the nature of which our ignorance was almost complete—stimulated the imagination of administrators. The importance of medical research and laboratories to the welfare of a modern community was recognised as never before. The number of research institutes and laboratories, and all the invaluable work that has been done therein, that we owe primarily to plague is very large. The medical profession has taken full advantage of the opportunities thus afforded. As has been said, our ignorance of plague in 1894 was profound: to-day there is, perhaps, no disease about which we have more detailed and exact information than we have about bubonic plague, more particularly with regard to its etiology, epidemiology and prevention. There are lacunæ in our knowledge still to be filled in, but the story is almost complete.

Bubonic Plague and Pneumonic Plague compared and contrasted. Justification for considering them as two separate and distinct Diseases.

The one outstanding problem about which information is most urgently needed concerns the amazing contrast presented by the epidemiology of bubonic plague and of pneumonic plague respectively. On this question much has been written, but little more than nothing is known. Nevertheless, the problem is one of fundamental importance. It forces itself upon one's attention at the commencement of every discussion about plague. The fear that bubonic plague can give rise to epidemics of pneumonic plague influences sanitary conventions and the port health rules and procedure of almost every country. On what grounds is this fear based?

Most writers about plague would prefer to postpone a discussion of this complex and obscure question to the end of the chapter. As it has a direct bearing on almost everything that one has to say regarding the prevention of the disease, it is proposed to deal with it first.

For clearness, it would be well to state the problem in simple language. Two diseases, bubonic plague and pneumonic plague, which, from an epidemiological point of view, are as different as any two diseases well can be, are both attributed to the *Bacillus pestis.* No real difference has ever been demonstrated between plague bacilli isolated from patients suffering from primary pneumonic plague and those isolated from patients suffering from bubonic plague.

Bubonic Plague a Rat Disease.

Bubonic plague is essentially a disease of rats, the infection of which can be, and is, communicated to man and to certain of the lower animals through the agency of the rat-flea. The absolute dependence of the human bubonic plague epidemic on a concomitant rat epizootic is an established fact. The community that harbours no rats is quite free from risk of infection by bubonic plague, which is not spread directly from man to man. Plague hospitals in British India and in other parts of the East in which epidemics of bubonic plague occur are almost completely free from danger to doctor and to nurse in spite of the fact that the precautions taken to avoid infection are nil compared with the elaborate precautions that are absolutely essential during pneumonic plague epidemics of the north. In this connection it must be remembered that terminal plague pneumonias, in which the patient may expectorate sputa containing innumerable virulent plague bacilli, are by no means rare in fatal cases of bubonic plague. Such cases may even recover, though such an event is very rare. Further, evidence of the lack of infectivity of human bubonic plague patients is afforded by the fact that approximately 75 % of cases of bubonic plague are single cases, that is to say, one case per house. When multiple cases occur, it is the rule for them to fall ill more or less simultaneously. Such facts indicate that a house remains infective for a very short period of time. Such has been the experience in India in numerous outbreaks that have been carefully observed in small towns and villages. In large cities, with their large tenement houses, other complicating factors may come into play. Finally, it should be noted that bubonic plague has a case mortality rate of about 70 %. The fact that the statistics of numerous countries show a higher mortality rate than this generally indicates that mild cases go unreported.

Exceptions to one or two of the above dogmatic assertions do occur; they will be dealt with subsequently. They are relatively unimportant, and not in any sense decisive to the present argument. For example, a few small outbreaks of what appears to have been primary pneumonic plague, originating from a case of bubonic plague, have been reported in British India, but they are of no practical moment compared with the eleven million deaths that plague has caused in that country. Small outbreaks of pneumonic plague have been reported in Java also, but the total mortality of such outbreaks is small when compared with the total plague death-roll. These facts are mentioned here to show that they have not been overlooked : they are of interest and will be referred to again. They do not, however, affect the main thesis that the dependence of bubonic plague epidemics in man on a concomitant rat epizootic is, for all practical purposes, absolute.

Primary Pneumonic Plague.

Pneumonic plague epidemics, such as have been experienced and studied in Manchuria in 1911 and in 1920, are of a totally different character. These two explosive outbreaks both appear to have originated in Siberia. The disease spread with startling rapidity. Infection was conveyed directly from man to man. The mechanism of infection bore a remarkable resemblance to influenza, such as we knew it during the pandemic of 1918-1919. Anti-plague serums and vaccines were without avail. The case mortality rate was 100 %. None appear to have been immune. The neglect of precautions with regard to the wearing of efficient masks by doctors or nurses when attending to patients in the infectious stage of the disease was almost invariably followed by infection and death. The freedom of the rat population from plague infection during pneumonic plague outbreaks is remarkable. During the 1911 outbreak in Harbin, when upwards of ten thousand persons died of the disease, no plague-infected rat was ever found, and no case of bubonic plague came under observation. These are most significant facts. Harbin is a city that obviously harbours a large rat population. It is true that, at the termination of the pneumonic plague outbreak of 1920 in Vladivostok, cases of bubonic plague occurred. Such an occurrence is quite exceptional in pneumonic plague outbreaks, and it is noteworthy that Vladivostok is a port presenting obvious facilities for the importation of rat plague.

Elsewhere in this report reference is made to the plague experience of Newchwang (Yingkou), a river port of some importance in South Manchuria, near the northern shore of the Gulf of Pichili. From 1898 to 1906 Newchwang suffered from annual outbreaks of bubonic plague with a considerable rat mortality. It has not been possible to obtain statistics regarding the case incidence and mortality of these outbreaks; both were considerable. It was, however, the writer's good fortune to meet an English doctor who worked in Newchwang during those years. He, in common with all others with a considerable experience of bubonic plague, had seen cases in Newchwang in which a plague pneumonia brought the attack to a fatal conclusion. None of these annual outbreaks of bubonic plague in this South Manchurian port ever gave rise to an outbreak of pneumonic plague. The outbreaks were, as regards their epidemiological features, exactly comparable with bubonic plague outbreaks in India, Hong-Kong, Shanghai, Java, Japan and elsewhere. It should be stated that Newchwang is a crowded Chinese town which, at that time, possessed no public health organisation of any kind, and quite an inappreciable percentage of the cases of plague that occurred were treated in hospital.

The plague experience of Newchwang has been referred to at this length for obvious reasons. Bubonic plague outbreaks occurring year after year in a climate that is known to be favourable to the evolution of pneumonic plague epidemics, without giving rise to such epidemics, are more than noteworthy. In the literature devoted to the subject, climatic conditions are almost invariably put orward as affording an adequate explanation of the assumption that the plague bacillus

sometimes produces epidemics of the bubonic type, at other times epidemics of the primary pneumonic type. The experience of Newchwang would be sufficient, were no other data available, to cause one to regard such explanations as insufficient. Many other facts point to a like conclusion.

As regards the mechanism of transmission of infection from man to man, no two diseases, perhaps, are more similar than are pneumonic plague and influenza. The havoc caused by influenza in British India during 1918-19 is still fresh in man's memory. At that time there was plague infection in abundance in India. The weather in the north of India in the winter-time is extremely cold, and plague infection is generally present, but, as has been stated, pneumonic plague outbreaks in India are so rare and so circumscribed as to be of no practical account. Similarly, Shanghai, which has climatic conditions known to be favourable to the epidemic evolution of pneumonic plague, has never suffered from an outbreak of that disease, though year after year it was infected with bubonic plague. On the other hand, the pneumonic plague outbreak of 1920 in Vladivostok continued through the hot months of July and August Whatever the factors that determine the evolution of plague, sometimes in a pneumonic form, at other times in bubonic form, it can be asserted that "climatic conditions" are not among the chief.

Symbiosis in causation of Pneumonic Plague Epidemics.

A prolonged and careful study of all the available epidemiological data, only a fraction of which has been referred to here, has driven the writer to the conclusion that the plague bacillus *alone* does not, and cannot, cause widespread epidemics of pneumonic plague. It seems more than probable that there is an additional organism at work—in other words, the plague bacillus in symbiosis with another organism is responsible for epidemic manifestations of pneumonic plague, which is a disease *sui generis*. The confirmation, or refutation, of this theory must pend further laboratory investigation, opportunities for which may be afforded by the next outbreak of primary pneumonic plague. If the existence of this hypothetical organism be postulated—an organism non-pathogenic for rodents—all, or nearly all, regarding the history and epidemiology of plague that is obscure in the light of present knowledge becomes clear. In the meantime there is quite sufficient epidemiological fact to guide the framing of rules and regulations.

It is realised that the enunciation of a somewhat revolutionary theory in a report of this nature is open to criticism, more especially as space only admits of a very incomplete discussion of a very large question. *Whether or no the theory be accepted, the few facts that are put forward in this report afford ample justification for regarding bubonic plague and pneumonic plague as two separate and distinct diseases from the point of view of sanitary conventions and prophylactic procedure.* If this be done, plague prevention can be rendered less irksome and more effective than it is at present; it will be possible to concentrate on probabilities and essentials and to neglect mere possibilities.

It is not denied that the direct transference of infection from the sick suffering from bubonic plague to the healthy is possible *in exceptional circumstances*. The very occasional infection of the attendant on the sick must sometimes be explained in this way. Some of the small circumscribed outbreaks of pneumonic plague that have arisen during the course of bubonic plague epidemics are apparently susceptible of no other explanation, but such limited outbreaks appear to have been vastly different from epidemic pneumonic plague of more northern climates. Some of them have been circumscribed in spite of the fact that no strict measures of segregation, or any measures at all, have been applied.

It is not contended that the plague bacillus is unessential to the development of pneumonic plague epidemics. On the contrary, it is certain that the plague bacillus is chiefly responsible for the 100 per cent case mortality rate of such epidemics. It appears to play a role similar to that played by the pneumococcus during the pandemic of influenza in British India. The analogy is apposite. In certain circumstances infection with the pneumococcus is acquired by close contact with pneumonia patients. Epidemics of pneumococcus pneumonia may occur, but the pneumococcus alone is incapable of producing widespread pandemics of the influenzal type.

Non-Infectivity of Human Bubonic Plague.

One of the chief objects of this chapter of the report is to urge the non-infectious nature of human bubonic plague. The space that has been given to exceptions to this generalisation must not be allowed to endow them with an importance that they do not possess. Undoubtedly plague patients with lung involvement should be isolated and nursed with adequate precautions, whenever possible, but it must be realised that such desirable measures are daily neglected with impunity in countless crowded Oriental towns in which the excessive mortality caused year after year by "respiratory diseases" is indicative of unhygienic conditions of the worst possible type. The significance of these facts cannot be overlooked.

Hitherto the quite unwarranted assumption that human bubonic plague cases play a part of importance in the propagation of the disease has influenced sanitary conventions and port health procedure in many countries. The real sources of danger have received much less attention than they deserve. If all attention had been focussed on the fundamental truth that bubonic plague is a rat disease, first and last, the disease would have had a much more confined geographical distribution than it has, and anti-plague measures would have been less irksome.

"Septicæmic" Plague.

One of the causes of certain prevalent misconceptions regarding the epidemiology of plague appears to have arisen from the subdivision of bubonic plague cases into "septicæmic" and "bubonic" cases respectively. Many writers use these two terms as if they applied to pathological conditions of a totally different nature. "Bubonic plague" may not be an appropriate name for a case so severe that death supervenes before the development of the characteristic bubo, but custom has sanctioned the use of the term in a generic sense. The use of the term "septicæmic", to describe such a case would not be open to criticism if it were always clearly kept in mind that the vast majority of plague cases have plague bacilli in their blood at some period of the disease and that the difference between "bubonic" and "septicæmic" cases is one of degree, not of kind. Unfortunately this is not always the case. Dr. Hirst of Ceylon, whose contributions to plague literature have been so valuable, considers the human "septicaemic" case as capable of giving rise to an epizootic and states that such an event has occurred in Ceylon; details are not given. The possibility of such an event occurring is not denied, but the illuminating plague reports of Ceylon, where a much greater percentage of cases have been "septicæmic" than elsewhere, and the history of the introduction of plague into that islands afford a remarkable illustration of the dependence of human plague on a pre-existing rat epizootic.

On the whole it would be well for plague literature if the term "septicæmic" plague were rigidly confined to the description of a clinical condition, and its use rigidly excluded from writings on the epidemiology of the disease. In certain countries much confusion has arisen from the misuse of the term.

Perhaps enough has been written in support of the writer's earnest desire to see bubonic plague and pneumonic plague treated as two separate and distinct diseases from the point of view of sanitary conventions and port health regulations.

Pneumonic Plague in Manchuria.

When speaking of pneumonic plague it is hardly possible to refrain from mentioning the interesting research work that is being done in the North Manchuria Plague Prevention Service's laboratory in Harbin, under Dr. Wu Lien Teh's able leadership. The results obtained are of great interest, even though, as appears probable to the writer, they may have been studying a part only of the problem. The "respect" with which the plague bacillus was treated in laboratories in Manchuria gave much food for thought. That respect had been engendered of intimate and sad knowledge of the potentialities of the microbic cause of pneumonic plague and it would have been foolhardy to ignore the lesson learnt at such a cost. Nevertheless a doubt could not be suppressed as to the necessity of handling the plague bacillus with such circumspection, in the mind of one whose laboratory experience of plague has been confined to India, where, at any rate, such precautions are unnecessary.

The praiseworthy work carried out by the North Manchuria Plague Prevention Service and the Medical Department of the South Manchurian Railway in limiting the spread of the pneumonic plague epidemic of 1920 has been referred to elsewhere. They, in co-operation, performed a work of great international importance. Incidentally their experience showed that, given a zealous health service and reasonable control of traffic, the spread of pneumonic plague can be readily circumscribed.

Bubonic Plague : how it is spread.

The appearance of bubonic plague in Canton and the rapid involvement of the neighbouring city of Hong-Kong took place in 1894. In the following list the date of first infection of certain important ports in the East is set out in chronological order :

Hong-Kong	1894
Bombay	1896
Osaka	1896
Formosa	1896
Manila	1899
Singapore	1901
Bangkok	1904
Rangoon	1905
Shanghai	1908
Soerabaya	1910
Colombo	1914
Semarang	1916
Batavia	1920
Macassar	1922

This short representative list is in itself of very considerable interest. Of the ports and places mentioned all but three remain infected to-day : Formosa, Manila, and Shanghai. Osaka has had plague-free periods. The remainder have remained persistently infected since the dates mentioned in the list.

It must not be assumed that all the places referred to possess conditions equally favourable to the prevalence of bubonic plague : this is certainly not the case, but the history of the disease shows that in none can the conditions be regarded as very unfavourable to a rat-plague epizootic.

Nevertheless many years elapsed in certain cases before infection was successfully implanted, though maritime communications with plague-infected ports were constant throughout. It must be conceded that the preventive measures employed were in no appreciable measure responsible for the long plague-free periods. The facilities that exist to-day for the transference of rat plague from port to port are sufficient to negative any such supposition. One is driven to assume that the disease is not easy to spread by means of shipping, even in the presence of such facilities, and that certain measures taken to close the more usual gates of entry of infection would be sufficient to ensure the almost absolute immunity of a plague-free country. Such considerations endow with very great practical importance the study of the means by which plague infection is transferred from place to place and from port to port.

The Importance of Grain and the Grain Trade in the Spread of Plague.

As far back as 1911 a prolonged study of the behaviour of plague in India had driven the writer of this report to the conclusion that grain was by far the most important vehicle for the carriage of plague infection over considerable distances. In one province of India there was a relationship between the imports of grain into various areas and the amount of plague from which such areas had suffered. Certain large areas appeared to owe their immunity to plague in chief part to the fact that their imports of grain were extremely low or non-existent. There was a great mass of evidence of like character. The observation is not of course remarkable : in the East, as elsewhere, rats are much more numerous in grain stores and markets than they are in other places. It is for this reason that grain stores and markets afford special facilities for plague infection surviving the adverse climatic and other conditions of the non-epidemic season. During the height of the epizootic, which incidentally synchronises in many parts of the East with the harvest, a time of the year when the movements of grain are especially active, the dangers attendant upon the transference of such merchandise from an infected to a plague-free locality are obvious. Consignments of grain afford opportunities for the transport of rats and rat-fleas unsurpassed by those afforded by the movements of any other form of merchandise, and they are placed in the most rat-infested parts of the town of arrival.

Since 1911 accumulated experience in many countries has endorsed the soundness of the contention that the proper storing of grain and such rat-favoured merchandise and the proper control of the traffic in such material are almost synonymous with efficient plague prevention measures. Cargos of rice were responsible for the first implantation of plague infection into Ceylon in 1914, eighteen years after Bombay was first infected. Colombo became infected very shortly after Negapatam, which was then the chief port of supply of rice for Ceylon, had commenced its first epidemic of plague. Those eighteen previous plague-free years afford most striking testimony of the relative unimportance of the human being from infected localities, with miscellaneous baggage and personal effects, as a vehicle for the transmission of plague infection over anything but short distances. The history of plague in Java is replete with lessons of a like nature. After sixteen years intimate trade relationship with plague-infected ports, infection was successfully introduced into Java almost certainly with rice. With rice, infection was conveyed from the port of Soerabaya into the hinterland of Java. Similarly, rice was the cargo incriminated in the more recent infection of other Dutch East Indian ports. In the above-quoted instances rice was in each case the variety of grain at fault : all the countries in question are rice-eating countries. It must not be inferred that this variety of grain is more dangerous than others. This is certainly not the case.

It would be possible to adduce many more facts illustrative of the extremely dangerous nature of the grain trade as now carried on in regard to the spread of plague—illustrations taken from the plague history of many parts of the world. This is hardly necessary. It may even be thought that the stress already laid on elementary considerations, the importance of which is not now challenged by any epidemiologist with intimate knowledge regarding the spread of bubonic plague, is incompatible with a report of this nature. If this be so, the persistent and inexcusable neglect in many countries to put into practice the elementary lessons taught by a quarter of a century's bitter experience is more than sufficient justification for the writer's insistence on the obvious.

It can be asserted that were it possible to break the association of rats and grain the control of bubonic plague would be readily assured. If the association could be broken in the ports of the world there would be little or no danger of transporting plague overseas. The question at once presents itself : are these tasks possible of accomplishment, and, if so, how, and at what cost?

It is neither possible nor desirable in this report to condense a treatise on anti-plague measures, but the question of the storage of rat-favoured merchandise is one of such moment to all plague-infected or plague-threatened ports in the East that the following observations and suggestions may not be out of place.

"Rat-Free" Grain Storage.

In most of the big ports of the East one can see the attempts that have been made at "rat-proofing" stores and godowns, but it would be hard to find a store that is free of rats. The rat population of certain of these "rat-proofed" stores is very large. The result of these somewhat elaborate and expensive attempts at solving the problem has engendered a feeling that the task is a hopeless one. It must be admitted at once that the rat-proofed storehouse with floor and walls of concrete, or other material impermeable to rats, is an enormous advance on the large rat-ridden store-houses that one sees to-day; for example, attached to the rice-mills in all the

large rice-exporting ports of the East; store-houses with floors honeycombed with rat holes and from which rice is placed on rat-infested lighters en route to a sometimes rat-infested ship. This latter form of storehouse is just hopeless, whereas in the rat-proofed variety, if the turn-over be sufficiently rapid and constant, the rat population can be kept more or less under control. The relative failure of the rat-proofed store is due to the fact that burrowing is not essential to any of the varieties of *Rattus rattus*, the most important plague rat of the East. This rat finds admirable nesting accommodation between sacks of grain in even the best constructed store, if such sacks be left sufficiently long undisturbed; hence the importance of a constant and comparatively quick turn-over. (The high incidence of plague among persons engaged in sorting old gunny-bags from small grain stores in Colombo has been noted.) Such a quick turn-over of grain is not always practicable. There are times when stocks must be held for long periods. The question therefore arises : is it possible to construct a rat-free store in view of the ever-present probability that rats will be introduced with the grain or similar merchandise? If due attention be paid to the habits and capabilities of the rat such a task is possible.

Rats cannot live on dry grain alone; water is also essential. If deprived of water, *Rattus rattus* may develop those cannibilistic tendencies, of which too much has been made in certain contributions to plague literature, if they cannot escape. A very small quantity of water will supply a rat's needs—the moisture on grass or green vegetables will suffice. The first essential in the construction of a rat-free store is therefore to exclude water. The roof must be rain-proof; all openings must be protected from driving rain by roof projections, and nothing other than dry grain must be kept in the store.

Rattus rattus cannot jump as high as three feet in a vertical direction, and, though an admirable climber, it cannot circumvent a horizontal projection, smooth on the under-side, if such projection be nine inches in width.

No part of a building used as a large grain-store should in any circumstances be used for human habitation.

In these three short paragraphs are compressed all the desiderata necessary for the construction of a rat-free store. Such a store would be built on a plinth three feet high, constructed of material impermeable to a rat's burrowing. This plinth would be surmounted on all sides by a projecting ledge nine inches wide, smooth on the under-surface. On the side containing the entrance this ledge could conveniently be expanded to two and a half or three feet to facilitate the transference of sacks of grain from or to railway wagon, bullock cart, lorry or the coolie's back. No steps or similar easy means of ingress or egress would be permitted. The roof would be raintight and project sufficiently to protect the ledge and platform from driving rain. No trees would overhang the store. Into such a store rats would be introduced from time to time. They would have to leave in search of water and they would find their return impossible.

These ideas have been propounded by the writer on many occasions; such godowns have been constructed. The subject is summarised once more in this place because of the conviction that the suggestions will prove of use and interest to many in the East who are grappling with a health problem of international importance, as well as one of great local concern.

Controlling Rats in "Rat-proof" Stores.

On many occasions during the course of the long tour, advice was sought as to how the more easy control of the rat population might be secured in rat-proofed storehouses that had been constructed at great expense but with too little consideration for the habits of the rat. In most cases modifications on the lines propounded above were impossible. One suggestion is worth mention. Attempts at breeding the wild *Rattus rattus* in captivity failed until a short length of drain-pipe, installed underground, was made accessible to the rats; in the bends of such a pipe the rat appeared to find an eminently suitable nesting-place, and one infinitely preferable to the shelter afforded by adjacent sacks of grain. If, then, a porcelain drain were to be embedded not too deeply near the junction of the wall and floor on all four sides of the storehouse, and if such a drain were connected with the interior of the store, at intervals of, say, twelve feet, by means of branch pipes of, say, two inches diameter, an attractive "home for rats" would be provided which could be kept easily under control. Once a month, or at more frequent intervals, the interior openings of the branch pipes would be closed and the rats in the enclosed system could be drowned or gassed. To facilitate this the drain would have a slight fall to one corner where a closed trap could be constructed. After this procedure the drain would be dried and otherwise made attractive to the next tenants.

These digressions into practical details have been made with the purpose of indicating that there are innumerable devices that have not yet been taken advantage of in the warfare against the rat, which in the East is so important a phase of public health activity. It is desired to stimulate interest in a matter of first-class importance and to combat the lethargy and want of initiative that is in evidence in not a few plague-infected places in the world. There is a tendency to confess oneself defeated before the fight has really begun. This is most regrettable. The problems are not insoluble once their importance is realised. A closer co-operation between the engineer and the public health official will accomplish much.

In what has gone before, most attention has been paid to grain because of its fundamental importance. Other forms of merchandise need attention : for example, baled cotton from a plague-infected port has been instrumental in "infecting" a ship, which in its turn introduced infection into a Japanese cotton-mill. Many of the remarks made above are applicable to merchandise other than grain, and to the important task generally of keeping the port areas of the ports

not only in the East but in all parts of the world as free as possible from rats. If that could be done little more would remain. In the meantime other measures will continue to be imperatively necessary.

Fumigation of Ships.

Chief of these are the periodic fumigation of ships; the fumigation of infected or suspicious cargo from infected storehouses, and the fumigation of the lighters and barges which in so many ports are used as the means of communication between ship and shore. These subjects are difficult to compress into small space if no essential considerations are to be ignored.

It may be stated at once that the ideal method of fumigating a ship has not yet been discovered nor is it likely to be discovered until certain small modifications are introduced into the structure of ships so as to facilitate the operation. The amount of research work recently done in connection with ship fumigation indicates that the pressing importance of the question is realised, and there is little doubt that the near future will place much more efficient means at our disposal.

In certain parts of the world, ship-owners, and others with a direct interest in the profits of shipping companies, have protested against the necessity for frequent fumigation of ships. One is sometimes informed that current methods are of very limited use, that they do not destroy more than a limited number of the rats present, and that the process is certainly not worth the time and expense involved. Such protests appear to be less in evidence in the Far East. Masters of Chinese river-boats among others appear to value regular fumigation on account of the freedom from cockroaches that the proceeding entails. It was encouraging, too, to find business interests in one large and important Eastern port (which once suffered from plague but which has been for some years plague-free) insistent in their demand that no reasonable measures to prevent re-infection should be ignored. This attitude was a valuable endorsement of the economic importance of plague. But, like all port health measures, fumigation regulations must not be of such a nature as to interfere unduly with trade interests. Fortunately the best interests of commerce and public health are often identical. They certainly are when such a disease as plague is concerned.

In Far Eastern ports the gases used for fumigation of ships are either: (1) sulphur dioxide, generated usually by the well-known Clayton apparatus, but sometimes, and less efficiently, by the pot method, *i.e.* burning sulphur in open pots and very exceptionally by the use of compressed S. O. 2 in cylinders; or (2) a mixture of carbon dioxide, carbon monoxide and nitrogen gases, generated by the Nocht-Giemsa method, which in essence is the incomplete combustion of coke and the passage of the resultant gas through water. The latter method is the one employed in all the ports of Japan, and, as an alternative to the Clayton method of sulphur fumigation, in Shanghai. Elsewhere in the East sulphur dioxide gas is used exclusively. Data are not available to enable a comparison of the relative efficiency of the two methods. The oxides of carbon are innocuous to all forms of cargo. The advantages of using a heavy gas in the fumigation of a ship in freight are considerable, but doubts as to the lethality of the gas generated by the Nocht-Giemsa method for certain forms of insect life (notably fleas) are expressed : rats are certainly killed. No form of cyanide fumigation is at present being used in any ports of the Far East, nor has the recently introduced American cyanochlor method been adopted.

There is a unanimity of opinion regarding the desirability of frequent periodic fumigation of all ships, especially those which trade with plague-infected countries. The six-monthly fumigations prescribed in the revised text of the International Convention are in general approved, though the authorities in the Dutch East Indies are in favour of shortening the period to three months, as is done under their own port health regulations.

In certain of the ports of the Far East the fumigation of ships is undertaken by the port health authorities, employing their own plant and their own trained personnel. In others the fumigation is in the hands of private fumigation companies. In the conditions prevailing in the East the former is the preferable procedure. If the fumigation be left to private companies the operation should certainly in all cases be carried out under the control of the health authority of the port, who would then be in a position to give a certificate of fumigation. It is desirable also that no long-term contracts be given to private firms if such contracts impede in any way the adoption of any other more efficient form of fumigation which research may at any time place at our disposal.

If attention be paid to detail, which need not be referred to here, most, if not all, of the methods of fumigation in vogue are capable of destroying a very high percentage of the rats in a ship if the ship be empty.

The Treatment of "Infected" Merchandise.

The practicability of fumigating efficiently a vessel in freight has been much discussed : the question is of great importance. In many plague-infected ports of the East there are at present no facilities for the treatment of plague-infected or plague-suspected cargo before such cargo is placed on board ship. In such circumstances it is the general practice to fumigate the ship in freight. In certain ports, however, the ships are fumigated empty, the cargo being fumigated in lighters before being placed on board. The latter method is more troublesome but it is undoubtedly safer if properly carried out. It is moreover of more general application, for it frequently happens that a portion of the cargo is from its nature of no importance from the plague point of view, though at the same time it may be susceptible to damage by the method of fumigation most commonly employed.

Pending the time when the port areas of the important ports of the world will be kept rat-free, the question of the treatment of rat-favoured merchandise from plague-infected ports will continue to possess its present importance. Speaking generally, the measures in vogue in the Far East are very deficient in this respect. It is hardly possible to make suggestions for improvement that are applicable to all ports. Local conditions and circumstances of trade differ widely. As an illustration of this, one instance will suffice. Of all ports in British India, Karachi is second to none in importance from the point of view of grain export. The importance of grain as a medium for the export of plague infection has been laboured above. Karachi receives its wheat for export from the Punjab chiefly at the time of year when plague in the Punjab is at its maximum. The Punjab has been far and away the most heavily plague-infected province of India. With the wheat, Karachi has frequently received plague infection. The disease has been persistent in that port. Notwithstanding all these circumstances Karachi stands alone among the large ports of India inasmuch as, to the best of the writer's belief, it has never been accused of exporting plague infection overseas; though complaints regarding other ports *e.g.* Bombay, Rangoon and Calcutta have not been infrequent in the past. The explanation of this anomalous state of affairs is simple. It is the local trade custom to ship all wheat from Karachi in new gunny bags. The wheat is emptied out of the bags in which it has made its journey from the Punjab on to concrete platforms, where one can at times see huge mounds of grain. The wheat is there rebagged and placed immediately on board ship. This procedure was not prompted in any way by considerations of public health, but it would be difficult to devise more simple or more effective anti-plague measures. Unfortunately climatic conditions and questions of space make it impossible to introduce anything of the kind in other important plague-infected Eastern ports.

In ports where grain or other rat-favoured cargo is held up for long periods other measures must be devised. In many ports it would be possible to treat plague-suspicious cargo on land in specially constructed buildings or chambers employing cyanide gas as the fumigant. After fumigation the merchandise could be put at once on a rat-free ship or into rat-free lighters. In most plague-infected ports visited such a method would be capable of application with modifications suited to local conditions. In certain ports the chamber might take the form of a tunnel into which railway trucks could be run. The dangers attendant upon the method could all be obviated with the display of a small amount of intelligence. Recent years have provided much xeperience in this form of fumigation, which, from the plague point of view, is undoubtedly the most efficient of all. In certain ports it might not be difficult to erect a fumigating tunnel into which lighters loaded with cargo could be floated. The importance of the subject and its present neglect have prompted these few observations, which may be of use to some of those now engaged in the study of the question.

Fumigation of Lighters, Barges and Junks used in Ports.

Another matter which is overlooked, or regarded as impracticable, in many Oriental ports relates to the fumigation of lighters and barges used in the ports. The degree of rat infestation of these barges in certain ports is almost incredible. This question receives praiseworthy attention in certain ports, for example in Colombo, the ports of the Dutch East Indies, and in Shanghai. Elsewhere it is almost if not entirely neglected. In certain ports one can see quite a large amount of trouble taken to see that rat-guards are properly placed on the cables which attach the ship to the wharf (a matter of subsidiary importance), and a few yards away cargo being hoisted into other ships from rat-infested junks and barges lying close alongside, in such a way as to make it difficult to avoid hoisting an occasional rat on board. Those barges and junks are in many instances filled with cargo from rat-infested stores, often with a neglect of all reasonable precautions to prevent rats going aboard. In certain large Oriental ports numerous cases of plague have occurred among the large floating populations in the harbours. Such an occurrence reflects discredit on those responsible. It is very difficult to keep certain houses in the crowded areas of an Oriental city free of rats during a plague epidemic, but it is easy to destroy rats in junks and barges. The fumigation of lighters and barges presents no difficulty at all. When empty, pot sulphur fumigation is sufficient if the boat be covered with tarpaulins, though a Clayton apparatus is more expeditious and more effective. Junks present greater difficulty, but, of the numerous junks inspected with the special idea of estimating these difficulties none were seen which could not be adequately fumigated given the display of a little ingenuity. In all ports, lighters, junks, etc., employed in regular port work are registered and are under port control. Fumigation at the time of inspection and registration would not be an impossible or even a very arduous task, given the organisation that all important ports should possess. This remark is made with full appreciation of the very large number of such vessels employed in certain ports.

These considerations are not without their application to much local traffic along the Chinese and other coasts of the Far East. Such boats as touch at the bigger ports would, I think, be dealt with periodically (certainly during the plague season) if the importance of the subject were fully realised. It is to be hoped that the local authorities will give the matter their earnest consideration. In certain cases a fairly large sum of money would be involved, in return for which a great deal would be done to prevent the constant reinforcement of plague infection that is undoubtedly taking place. It might not be necessary to treat all boats; selection could be made of those which, from the nature of the cargo or from other considerations, such as the health conditions at ports of origin or call, were considered most dangerous.

It is probable that much more would have been done along these lines had it not been for the assumption present in the minds of the authorities at certain ports of the Far East that the presence of plague in the community under their control is unavoidable and that human endeavour is powerless to eradicate the disease. This assumption is certainly not warranted. A careful

study of the plague mortality figures of certain very large ports, which year after year report deaths from plague, indicates the probability that from time to time infection actually dies out and that in the absence of any organised anti-plague measures. If reasonable precautions were taken to prevent the re-introduction of infection, for which most abundant facilities now exist, advantage could be taken of such absolute or relative plague-free periods. Certain ports which have done much harm in the past in the matter of distributing plague infection could be kept plague-free. The history of plague is replete with lessons regarding the difficulty of transporting infection, even in the presence of abundant facilities. The long immunity enjoyed by certain important ports and the present immunity enjoyed by some are alike instructive in this regard. It is notoriously extremely difficult to eradicate plague from those large Oriental towns that possess conditions singularly favourable to plague, but it is not very difficult to prevent importation of infection if all measures be based on accurate knowledge. It is most important to combat the prevalent idea that because a town is infected with plague the introduction of a little more infection is a matter of no moment.

Human Plague as an Index of the Rat Epizootic.

Another cause of the comparative neglect of plague preventive measures in certain important ports of the East is the almost insignificant human mortality that plague causes in them. Emphasis has been laid on the fundamental truth that bubonic plague is a disease of rats and, from the preventive point of view, very little more. It follows that the human incidence of the disease is, in one sense, merely the index of a coincident rat epizootic. It is at times a very valuable index, but in certain conditions it fails. These conditions demand passing notice.

When comparing the results of certain investigations into plague outbreaks one is struck with the great diversity in the ratios between the number of infected rats discovered and the number of human cases reported in different parts of the East. Reference is made here only to investigations that have been for some reason or other exceptionally thorough and complete. In villages and towns in the interior of India, in the rural tracts of Java, and in Formosa, the number of infected rats found during an epidemic rarely exceeds the number of human cases reported. In other places, such as Bombay City, Shanghai and Osaka, the number of infected rats found is many times larger than the number of human cases reported, and this in spite of the fact that very much more thorough search is possible in the case of a small village than in large cities. In certain ports (*e.g.* Palembang), plague epizootics have occurred without giving rise to a single case. The reasons for this are of a twofold nature, one dependent upon rats, the other upon rat-fleas.

In most ports of the East, *Rattus norvegicus* (*decumanus*) is much in evidence, sometimes much more in evidence than is *Rattus rattus*. The former species is not nearly so domesticated as the latter, and does not come into such intimate contact with the human being. It follows that an epizootic of considerable severity may exist among the decumanus population of a port without giving rise to human cases of the disease. This is almost certainly one of the main causes of the persistence of plague infection with low human incidence that is characteristic of such important ports as Singapore and Soerabaya. It is not easy to estimate the relative danger of such ports to shipping. Though many enquiries were made, no detailed records were forthcoming as to the species of rat found after fumigation of ships trading in the East. The statement was generally made that the great majority of such rats, if not all, were *Rattus rattus*. This is a matter about which more information is required.

Another set of circumstances which may raise the proportion of infected rats found to the number of human cases reported, arises from the presence of mills, grainstores and the like, infested with rats. Here there may be an intense epizootic but no great facilities for the transference of infection to human beings.

In other ports neither of the above two explanations is tenable. In Shanghai, for example, in a densely crowded portion of the town where *Rattus rattus* is the predominant species prevailing in large numbers, the very large number of infected rats found in comparison with the very few human cases recorded exceeded anything in the writer's experience. In one year 249 infected rats were collected but only six human cases were reported, and this in conditions conducive to the closest possible contact between rat and man. In another year 187 infected rats were discovered, but no human case was reported. One was tempted at first to doubt either the accuracy of the figures or the accuracy of the diagnosis, a doubt which was only finally dispelled by learning of comparable and confirmatory observations in Japan. It was evident that, if the facts in Shanghai were as stated, some flea other than *Xenopsylla cheopis* infested the rats of that city. At the writer's request a small number (382) of rat-fleas were examined by the local authorities, of which 266 were of the genus *Ceratophyllus*, 114 were *Ctenopsylla*, and only 2 were *Xenopsylla*. One is justified in assuming that the rat-fleas of Shanghai are capable of spreading plague among the rats, but bite human beings only in very exceptional circumstances.

Systematic Rat Examination in Ports.

The above considerations emphasise the great importance of systematic rat collection and systematic rat examination in all ports of the Far East. There are ports where the human incidence of the disease is sufficient index of the severity of the epizootic, but such ports are in the minority. It is not only a matter of fundamental international importance without which no intelligent port anti-plague measures are possible: it is also in all cases a matter of vital local concern. In a few ports the examination of rats is carried out with great care, but in the vast majority there was not sufficient information about local rat-plague to enable any idea to be formed as to the difficulty or otherwise of ridding the town of plague altogether. Such examination

systematically carried on without intermission should soon enable one to determine the foci of infection that persist in the non-epidemic season, the time most favourable to strike hard against the disease and the channels through which infection gains entrance into the town. Above all, the rats in the port areas always call for careful scrutiny. In these matters the interests of all countries are at stake, and each country has a duty to perform to all others. The investigation must be as thorough as circumstances permit. In one important port town with a prevalence of human plague so low as to make one optimistic about the possibility of eradicating it altogether the capture of rats has in recent years been abandoned; as carried out, the measures appeared to have no influence on the evolution of plague in that city. This should have been an incentive to improve the measures employed, which, judging from the results published, were inadequate. Countries would be justified in considering any Oriental port as plague-infected in the absence of detailed reports regarding the results of rat examination by a trained and competent staff, more especially the rats in the harbour and port area. Such reports should in all cases give the number of rats examined.

"Rat-Guards".

No mention has been made of "rat-guards", which find specific mention in all port health regulations and conventions. The omission has not been due to an oversight. When one is face to face with conditions as they are in an Oriental port, and sees the many easy means of communication between ship and shore rats, one wonders why so much attention has been paid to the possibilities — admittedly existent — of rats running up and down ships' cables. Of all "rat-guards" the writer has seen, the electrical device invented by Major Taylor, I.M.S., simple, cheap and effective, is by far the best.

The Geographical Distribution of Xenopsylla cheopis and Xenopsylla astia as a Factor determining the Geographical Distribution of Plague.

The remarks made above, relating to the failure of human plague morbidity statistics to express the severity of the rat epizootic being dependent upon the species of flea infesting the rat, call for some reference to the interesting and important contributions to plague literature, recently published, regarding the geographical distribution of the species of the genus *Xenopsylla*, and the relationship of this distribution to the geographical distribution of plague. The question raised is one of first-class practical importance and it is much regretted that its adequate treatment is impossible here. The genus *Xenopsylla* has three species, *cheopis*, *astia* and *braziliensis*, all found upon rats in the East. Hirst of Colombo many years ago put forward the claim that *cheopis* was by far the most important as a vector of plague, and that the immunity of large plague-free tracts in India and elsewhere, including Ceylon, was explicable by the presence of *astia* and the absence of *cheopis*. Since then Cragg of India has collected information which supports the hypothesis in a general way. *Cheopis* is most prevalent in plague-infected areas : *astia* is most prevalent in places that remain plague-free or that have suffered very lightly from plague. Cragg acknowledges that the method employed in collecting the fleas did not allow an estimate of the degree of flea infestation of the rats in different localities which, as he rightly admits, is a matter of great moment. In spite of this, and of the fact that there are certain exceptions to the generalisation difficult to explain, it must be admitted that, taken together, the facts have an interesting significance : more work is certainly desirable on these lines. Hirst maintains that *astia* does not bite man with the avidity that *cheopis* displays in similar conditions. If this be so one would expect to see the ratio between human plague and rat plague disturbed in *astia* infested regions, as it is in Shanghai, for example; but the fact in itself would explain nothing as to the distribution of rat plague. Hirst also states that in his experiments he has been unable to transmit plague from rat to rat by means of *astia :* these experiments were done in Colombo. If *astia* be incapable of transmitting plague from rat to rat, the fact would throw important light upon the geographical distribution of the disease, and considerable space in this note would have had to be devoted to a consideration of what parts of the East are immune from danger of plague and vice versa. However, recent carefully controlled experiments carried out by Taylor in Bombay (which are unpublished at the time of writing) indicate that, in the climatic conditions prevailing in Bombay, there are very slight, if any, differences between *cheopis* and *astia* as regards their capacity for transmitting plague from rat to rat. It would appear, then, that other considerations are of equal or greater importance than flea species in determining the geographical distribution of rat plague. There the matter must rest for the moment. The opinion has been expressed above that conditions of commerce explain most, if not all, of the anomalies in the geographical distribution of plague that appear in the East.

The writer regrets that in the brief resumé given above scant justice has been done to important and interesting contributions to plague literature. Space does not permit of elaborating a subject which, however, from its nature could not be ignored. The above short discussion emphasises the need of more detailed information regarding the rats and the rat-fleas that infest the countries, more particularly the ports, of the Ear East. Such observations have been started in certain places. The collection and comparison of the data collected in the different ports might well yield results of scientific and practical interest and importance.

Present Distribution of Plague in Asia.

It now remains to say something of the present distribution of plague in the Far East as a whole.

India continues to be the chief reservoir of infection. Since the introduction of infection in 1896, approximately eleven millions of its inhabitants have died of plague. As explained elsewhere there are signs of a diminishing prevalence, especially in the provinces that have suffered most; in 1921-22 the plague mortality was only 62,000, the first occasion on which the figure had been below 100,000 since the disease established its hold on the country. Of its ports, Rangoon and Bombay are of chief danger to the outside world; Madras remains plague-free, and Calcutta has of late years suffered extremely little, though one would be glad to have more information regarding the rat epizootic there. The condition of Karachi's trade much diminishes the danger that it otherwise might be to countries with whom it has trade relations.

Java is the only island of the Dutch East Indies that suffers severely from plague. During each of the last two years plague has been responsible for approximately 10,000 deaths in Java. The disease is now more or less confined to the central part of the island, outside of which the persistence of rat plague in the port of Surabaya is a standing menace. One is safe in predicting that the energetic and well-designed measures that have proved their efficiency will, if persisted in, lead to the eradication of the disease from the interior of the island. These measures are worth close study. If the opinion be expressed that more attention might well be paid to the study and control of the disease in Surabaya, with a view to its eradication, it is not for want of appreciation of the difficulties and expense of a very important task. The recent infection of the port of Macassar has been mentioned elsewhere.

As regards the rest of the East, plague is to-day almost exclusively a disease of the ports, with remarkably few incursions into the hinterland.

Colombo is the only town of Ceylon infected.

In the Malay Peninsula the very little plague that exists is confined to Singapore, where there is too little information regarding the epizootic available to enable one to pronounce on the difficulties of eradication.

Bangkok is the only persistent focus of plague in Siam.

In French Indo-China, plague infection is usually present among the rats of Saigon and Cholon, but the most important focus of persistent infection is thought to be Pnom-Penh, the capital of Cambodia. As stated elsewhere it seems possible that the plague mortality of Pnom-Penh has been overstated, and that the task of eradicating the disease from that town may not prove to be one of great difficulty. In Annam there are two small persistent foci of plague infection in the small ports of Phanrong and Phanthiet. The eradication of infection in these two small towns should not be a matter of extreme difficulty. Small extensions of infection from these foci occur occasionally. Haiphong suffers from occasional outbreaks, as does Kwangchow Wan, but the disease is not endemic in either locality.

Hong-Kong still continues to report plague cases and deaths year after year. It must be admitted that the health problems of Hong-Kong are extremely difficult, but if endeavours commensurate with the importance of the port were made, it is quite possible that plague could be brought very quickly under control.

At the present moment no information is available regarding the prevalence of the disease in the ports of the China coast between Hong-Kong and Shanghai.

Shanghai has suffered severely from rat plague but has been completely free from the disease for several years. With the attention now being paid to prevention, Shangai is likely to remain plague-free indefinitely.

Japan has one small focus of rat plague in a restricted area of the important city of Osaka. In view of the efforts being made to deal with the matter one can predict the very early and complete eradication of the disease.

Formosa, which for many years suffered severely, has, thanks to a most praiseworthy campaign, been completely rid of infection and remains plague-free today.

In the Philippine Islands, Manila is the only town in which the disease ever gained a foothold. Energetic and well-designed measures, which reflect great credit on all concerned, banished the disease from the town, where it has not again secured a foothold.

Such is the distribution of the disease, and from the tale one can extract much cause for optimism as regards the outlook for the future, provided only the dangers attendant upon harbouring plague infection in one's midst are realised by all those in authority and provided that the despondency engendered by the failure of misdirected effort in the past can be replaced by the determination to start afresh on new lines.

Necessary Measures to be taken in the Port of Departure. Present Delinquencies.

In all the antecedent remarks that have a bearing on the carriage of plague infection overseas from port to port—as most of them have—it is implied that all necessary port health measures in this, as in all other diseases, should be taken at the port of departure. In conditions as they exist to-day a very considerable risk is run by the importing port, the reasons for which have been made abundantly clear. If there have been no cases of human plague on board and if no dead rats have been found "after careful search" the boat proceeds to unload cargo. There is no obvious reason why rat plague in the hold of a ship should, even in the majority of cases, cause human plague among passengers or crew, and one has only to look down into the holds of a ship in freight to realise how impossible a "careful search" would be to carry out, until the ship proceeds to unload. Then the harm may have been done—a harm terribly difficult to undo in conditions as they are in some ports. Familiarity breeds contempt—dead rats when found are "thrown away" if those in authority are unobservant. A stroll round large ports "in an unofficial capacity", entering into conversation with storehouse keepers and the like, will not infrequently elicit the naive confession: "I may see a dead rat now and again; if I do I just throw it out"—and

this without any apparent consciousness of having been guilty of a serious misdemeanour, let alone a crime. Such an experience has been the writer's in one of the best-administered ports of the East. Such incidents will become fewer and fewer when all in authority have more concise ideas as to the nature and the importance of the plague problem.

In some ports it might be possible to unload all "rat-favoured" or "plague-suspicious" cargo from infected ports into "rat-free" stores, or on to a special wharf—specially designed for the purpose—pending the time, which should not be far distant, when adequate well-directed measures are taken at the ports of departure.

Municipal Anti-Plague Efforts.

But very brief reference is possible to the large question of anti-plague measures in cities and towns of the East, considered as local municipal problems rather than from the port health point of view. Much of what has been said above applies here also. Speaking generally, anti-plague measures in the large port towns of the East are prosecuted with a marked lack of co-operation on the part of the populations at risk, amounting in certain cases to passive if not active opposition. In most towns there is a readiness to suppress information regarding rat mortality and the occurrence of cases of plague that is a serious, almost insurmountable, obstacle to efficient work. So much more good work might be done were it possible to enlist the active support of the population that the causes underlying the distrust and dislike of precautions taken in their own interest call for notice.

With full appreciation of the praiseworthy efforts made in arduous circumstances by self-sacrificing health officials of municipalities in the East, it must be confessed that certain of these efforts are from their nature predestined to failure, in the circumstances prevailing, and that other measures of far greater importance have been rendered almost impossible on account of the lack of essential co-operation for which the distasteful measures are responsible.

In many towns the first news of the occurrence of a plague case is received by the health authority as the result of an enquiry into the cause of death of the patient. The house in which he lived and its contents are promptly "disinfected" with some oil containing pulicide, and more or less thoroughly cleaned. In the process dead rats may be discovered. The "contacts" may or may not be observed or kept under some form of surveillance. A similar procedure, and with much more reason, would be adopted on the much rarer discovery of plague-infected rats in a house. In certain towns "contacts" would be inoculated with plague vaccine. When patients are discovered sufficiently early they would be removed to hospital.

Of the above measures the one that excites the greatest hostility is the process of "disinfection" of the house and its contents, and it is the measure which, from the point of view of plague, is of very doubtful utility—of no utility at all as usually carried out. Mention has been made of the very short period of time during which a house remains "infective". To disinfect a house after the death of the patient is to disinfect a house which is often much less dangerous than any other house in the vicinity. None conversant with conditions in the average Oriental town would deny that cleansing and disinfection are alike desirable from the general health point of view, but if the process result in the passive if not active opposition of the people to all anti-plague measures the price paid is much too high.

In conditions as they exist in most towns of the Orient active propaganda as to the nature and dangers of plague should be undertaken with patient persistence. The population might be promised absolute immunity from disinfection, isolation, and inoculation, and the other measures they dislike so much, provided they gave in return their active co-operation in the capture of live rats and the collection of dead rats. Houses in which plague-infected rats were discovered should be visited and the inmates warned as to the danger : they should be offered inoculation and assisted to vacate the dwelling for a time, if they so desired, but all form of compulsion should be eschewed. A more vigorous rat campaign by poisoning and trapping should be prosecuted in houses in the vicinity, whose inmates should also be warned of the danger. In this way the population might in time be induced to offer their help : if that be obtained the eradication of plague in many Oriental towns would not be far distant. It would at any rate be possible to obtain information about rat plague and to locate the infected areas. In several large ports to-day the existence of rat plague is discovered from the examination of dead rats which have been thrown from houses into the streets, where they are picked up by the municipal scavenging staff.

Finally the attention of municipal authorities of certain plague-infected towns in the East might be directed to the possibilities of the "Rat Lottery", which is one of the devices employed in certain towns in Formosa to stimulate interest in rat destruction. In return for each rat brought in, a ticket is given which entitles the holder to participate in a lottery, the prizes for which would be drawn on the receipt of, say, ten thousand rats or a hundred thousand rats as the case might be. If the first prize were to be a very considerable sum, and if the drawing were made with sufficient ceremony, very useful results might be obtained from the enlistment of the gambling propensities of the Oriental on the side of public health.

The condensation necessary to cover so wide a field in the above note has necessitated an assertiveness that is open to criticism. This is deeply deplored. All the assertions are the outcome of a close and careful study of a very large mass of material and a considerable practical experience in this sphere of work. The writer hopes that the note may serve as a stimulus to further activity and research on the part of those engaged in a great work, to many of whom he is indebted for much kind help and co-operation.

Summary of Conclusions

(1) Bubonic plague is, all things considered, the most important ship-borne disease in the Orient.
(2) Bubonic plague is essentially a disease of rats, and the human case is, for all practical purposes, not infectious.
(3) There is abundant epidemiological information, based on a quarter of a century's experience, to justify the consideration of bubonic plague and pneumonic plague as two entirely separate and distinct epidemic diseases.
(4) It is extremely doubtful whether the plague bacillus *alone* can give rise to pneumonic plague epidemics.
(5) Epidemiological facts indicate the probability that pneumonic plague epidemics are caused by the plague bacillus in symbiosis with another organism.
(6) It is probable that this "hypothetical" organism will be found to be non-pathogenic for rodents.
(7) Bubonic plague is invariably spread from port to port by means of "rat-favoured" merchandise.
(8) The fact that one is able to incriminate such merchandise in the transference of plague infection from place to place implies the relative failure of the human being and his personal effects as vectors of infection.
(9) All anti-plague regulations and conventions should be framed with due regard to these facts.
(10) Of all forms of rat-favoured merchandise, grain is of chief importance with regard to the facilities given for the transference of plague infection.
(11) The control of the grain trade and the proper storage of grain are almost synonymous with efficient plague preventive measures.
(12) If the association between rats and grain and other rat-favoured merchandise could be broken in the ports of the East, plague would cease to be a ship-borne disease.
(13) If due consideration be given to the attributes of the rat, it is possible to erect storehouses that can be kept automatically rat-free. Many "rat-proof" stores now in existence harbour a large rat population.
(14) Much more might be done than is done at present to control the rat population of such rat-proof stores : certain suggestions are contained in the note.
(15) The present condition of grain storage in many ports of the East is reprehensible and dangerous.
(16) Pending improvement in such matters, fumigation at periodic and frequent intervals of ships trading in the East will continue to be a matter of extreme importance.
(17) Further work is required to devise more satisfactory methods of fumigation than those at present in use.
(18) The disinfestation before shipment of rat-favoured merchandise from plague-infected localities demands much more consideration than it receives. Such measures should, wherever possible, be taken at the port of departure.
(19) The rat-infestation of lighters, barges, etc. employed in Oriental ports is sometimes excessive. Cases of plague among the floating population of certain ports occur from time to time. The periodic fumigation of lighters, junks, barges, etc. employed in all Oriental ports is an important matter that rarely receives the attention it deserves.
(20) The history of the spread of plague in the East indicates that attention paid to the usual channels of infection could secure almost absolute immunity from plague, and that without vexatious restrictions to the free flow of commerce.
(21) The tendency of the disease to die out in large areas of the East, unless reinforced by repeated introduction of infection, accentuates the importance of preventing such re-infection.
(22) From the epidemiological viewpoint, human bubonic plague cases are merely an index of a coexistent rat epizootic.
(23) This index is inadequate, or may fail altogether, in circumstances dependent upon either :
    (1) the nature of the rat-infestation of the port, or
    (2) the species of fleas that infest the rats.
(24) Such facts emphasise the absolute necessity for a systematic and thorough routine examination of rats in all Oriental ports.
(25) British India is by far the most important reservoir of plague infection in the East. Java comes second. The prevalence of the disease in British India is decreasing noticeably in those provinces that have suffered most.
(26) The experiences of Manila, Formosa and Shanghai, which have been plague-free for many years, promise a successful issue to a serious attempt to eradicate plague infection from many other Oriental ports at present infected.
(27) This task might not be insuperably difficult, except perhaps in the case of Bombay, which, of all large ports in the East, possesses conditions most favourable to plague.
(28) The gradual extinction of foci of plague would, by diminishing sources of possible re-infection, accelerate the natural tendencies to "die out" which characterise plague on either side of the Bay of Bengal and further east.
(29) In most Oriental towns, anti-plague measures are unsuccessful, largely on account of the antagonism of the population to such measures.
(30) The disinfection of houses and their contents is the most commonly practised of all anti-plague measures : it excites great antagonism and, as carried out, is of extremely doubtful utility.
(31) Suggestions are made regarding a new orientation of plague policy in many Oriental towns.

III — CHOLERA IN THE FAR EAST

A considerable amount of information regarding the prevalence of cholera in each of the countries in the Far East is contained in the sections of the report devoted to these countries. Here an attempt will be made to give an idea of the cholera situation in the Far East as a whole. This, from the very nature of things, must be more or less a bald statement of fact. Though recent years have witnessed important developments regarding our knowledge of cholera, from the laboratory point of view, one realises how little is known about the epidemiology of the disease when one attempts an explanation of its vagaries, its geographical distribution, and, above all, the amazing variations in severity that characterise the outbreaks of different years, in circumstances which appear to be at all times most favourable to the spread of the disease. It would be an extremely easy task to write a volume on the causes responsible for the prevalence of cholera in almost any country of the Far East, even if that volume were to contain nothing other than ascertained fact, but there is remarkably little to say when one is asked to explain the absence of the disease in certain countries, or its absence in certain years in other countries, or the remarkable cessation of epidemics with what appears to be sometimes a complete disappearance of infection, unless one indulge in hypothesis and conjecture. Here a difficult and most important field for research confronts us. The most promising line of approach to the problems would appear to be by way of a statistical study of the time and place distribution of the disease over a prolonged period of time and in many lands, comparing such data with information concerning climatological and other conditions likely to have a bearing on the question. It was at one time hoped that an opportunity might be afforded by the present enquiry to touch the fringe of the problem : unfortunately, this has not been possible in the time available.

To facilitate further discussion, a table has been drawn up which indicates the incidence of cholera, as represented by cholera mortality figures, during the past five years in certain ports and countries of the Far East.

Table indicating the Number of Deaths attributed to Cholera in certain Countries and Ports of the Far East during each of the past Five Years.

Country or Port	1918	1919	1920	1921	1922
Colombo	4	0	0	0	0
Bombay City	1,682	8,455	119	70	15
Bombay Presidency	8,834	51,551	2,047	3,521	?
Calcutta	1,526	3,688	2,302	1,997	1,269
Bengal	82,379	124,949	54,199	80,547	51,712
Rangoon	74	233	61	101	264
Burma	4,269	13,260	3,396	3,791	5,047
Siam	42 (1)	10,277 (1)	2,748 (1)	40 (1)	
French Indo-China	1,456	4,798	1,035	2,838	?
Manila	123	399	3	23	23
Philippine Islands	4,702	18,414	1,387	76	88
Java	9,864	8,861	17	1	28
Singapore	0	58	32	1	1
Federated Malay States	233	237	14	0	0
Hong-Kong	0	46	6	5	1
Shanghai	0	680	144	122	101
Formosa	1	2,696	1,675	0	0
Japan	0	915	3,121	16	417
Corea	0	11,084	13,568	1	23
Kwantung Leased Territory	0	6,300	small outbreak	0	0

The above table is instructive. It accentuates the well-recognised fact that cholera is endemic in the Indian Peninsula, where it rages with greatest intensity in Bengal and the neighbouring province of Bihar and Orissa. This endemic area extends into the Indo-China Peninsula, including Burma, Siam and French Indo-China. The disease is also endemic in the Philippine Islands and, almost certainly, in the Dutch East Indies. Little definite information is available regarding conditions in the interior of China. In most, if not in all, of the remaining countries of the East, recurring outbreaks appear to be dependent upon repeated reimportation of infection. The endemic areas of cholera thus appear to be in large measure concentrated between 10 degrees and 30 degrees north latitude.

Statistics show that certain provinces in British India are by far the largest and most persistent centres of cholera infection in the world. Here the cholera problem is one of unparalleled difficulty, being bound up with considerations of centuries-old habits, customs, and prejudices. The attention that is just beginning to be given to rural sanitation in India will, if persisted in, accomplish a very great deal to remove the grounds for India's unfortunate notoriety in this regard.

(1) Figures are for the Buddhist years 2461 B.E. to 2464 B.E., the latter terminating at the end of March 1922.

The varying severity of different outbreaks is well brought out in the above table. The unusually severe character of the outbreak of 1919, in so many countries presenting so wide a diversity of climatic and other conditions, is arresting, and indicates the very complex nature of some of the unsolved problems with which we are faced.

In the present state of our knowledge it is far easier to explain the persistence of cholera in such heavily infected endemic areas as Bengal and Bihar and Orissa than it is to explain the relatively cholera-free years, alternating irregularly with years of severe epidemic prevalence, that characterise certain countries of the East. In some of these, repeated introduction of infection at the beginning of the "cholera season" appears to be essential to the production of a severe epidemic, but, apparently, in other years certain conditions exist which are hostile to the epidemic evolution of the disease in spite of the introduction of infection.

For the purpose of illustration, the Punjab—the northernmost province of British India—serves well. The Punjab suffers much less from epidemic cholera than do the provinces of India situated in the Gangetic plain, but severe epidemics are by no means rare. The last annual report of the Director of Public Health of the Punjab contains some most interesting remarks on the subject. In 1921, cholera caused 19,215 deaths in the Punjab; in 1922, only 128 deaths were attributed to the disease (Punjab population 19,337,146). These 128 deaths were distributed among 16 of the 29 districts into which the province is divided, one of which contributed 78. The Director of Public Health states : "In 1922, cholera was reported from 33 centres, 28 of which were infected, directly or indirectly, from extraneous sources. In the case of the remaining centres, however, the outbreak was unquestionably of indigenous origin. It must therefore be accepted that the cholera-carrier exists in the Punjab and is capable of starting a purely indigenous focus of infection. The indigenous carrier, however, is of secondary importance to the imported case". A statistical enquiry is now being undertaken in the Punjab from which interesting results may be expected. It is obviously countries that suffer frequently but intermittently from cholera epidemics, rather than those with a persistently high incidence, that offer the best field for statistical enquiries of this nature. An explanation of the vagaries of the disease in such a province as the Punjab would throw light on what are at present the darkest chapters of cholera epidemiology.

In British India, epidemic cholera is chiefly—one might say almost entirely—a water-borne disease. Towns that have a protected water supply may and frequently do have sporadic cases of cholera, but they are secure against large epidemic manifestations of the disease. In town and village alike the disinfection of the water supplies almost invariably brings an epidemic of cholera to an abrupt termination. Undoubtedly the ubiquitous house-fly is much more than a potential agent in the dissemination of infection, but it is a matter of never-ending surprise that it is not a much more potent agent than it is. To see, as one always can, acute cholera cases being tended in native houses without any precautions whatever to prevent the spread of infection; to see in such houses dejecta and food alike attracting myriads of house-flies, and then to observe many, if not all, of the remaining inmates of the house free from infection, is a never-ending source of amazement to the sanitarian. The story is a very different one if the water supply becomes contaminated, and one can only postulate that most healthy persons can "eat" cholera vibrios in considerable numbers with impunity, but few people can "drink" cholera vibrios without very great danger of succumbing to an attack. At times, however, the "contact" case is of importance. From time to time cases occur in sporadic fashion in quarantine camps and continue to occur until precautions are taken to see that all inmates carefully cleanse their hands before partaking of food.

Such considerations as those mentioned are undoubtedly one factor of importance in determining the geographical distribution of intensity of infection. In certain countries in the East the inhabitants rarely drink "raw" water, taking their liquid in the form of tea.

In Japan, in which cholera is not an endemic disease, another set of factors comes into play. The Japanese consume food in an uncooked state more largely perhaps than any other people. Raw fish is an esteemed article of diet, and fish appears to be an excellent culture medium for the cholera vibrio. Fisher-folk play a part of importance in spreading the disease, which is, in Japan, practically confined to coastal towns and villages, and the closing of the fish-market is one of the earliest steps taken in combating a cholera epidemic.

Very large gatherings of people at fairs, festivals, pilgrimages and the like; unusual migrations of labour forces occasioned by scarcity, famine, or other cause; overseas pilgrimages such as that of Mecca—all play, or have played, a very large part in the East in the dissemination of cholera infection. That one is able so frequently to establish the harm done by pilgrims, returning from a pilgrim centre where cholera had made its appearance, in spreading cholera infection, even in those parts of India where one has to assume cholera-carriers to be ever present, is very noteworthy. The increased attention that has been devoted to the chief places of pilgrimage in British India during the past decade has done much to lessen the danger.

In several countries of the East, attention has been directed to outbreaks of gastro-enteritis, sometimes with a very high case-mortality rate, that occasionally herald the approach of epidemic cholera. Clinically, such cases simulate cholera, though competent bacteriologists have frequently failed to demonstrate the vibrio in the excreta. Later on in the epidemic the vibrio can be isolated in all cases without difficulty, employing the technique that previously failed. Such experiences have not been rare. A similar phenomenon has been observed, of course, in the case of outbreaks of other intestinal epidemic diseases, notably dysentery. Insufficient data do not permit of a discussion of the various hypotheses (such, for example, as "bacteriophages" or "mutation"), which might be capable of affording an explanation of the phenomenon. The problem is a fascinating one ; were it solved, much now obscure would be explained.

In any discussion of cholera prevention and control, water supplies call for first attention. Viewed as a port health question, no public health authority would deny that a plentiful water supply of a quality above suspicion is an essential to all ports with claims to be considered first,

or even second, class, as it is, indeed, essential to all towns of any size in the East that are liable to cholera infection. Speaking generally, the water supplies of the larger ports of the East are satisfactory, and water-boats are kept in a safe condition. There are, however, important ports in which improvements are most urgently required, either as to quality or quantity of water, or both. No further reference need be made to this matter beyond emphasising once more its pre-eminently important character.

The second prophylactic measure that calls for consideration is anti-cholera vaccination. The great war gave an impetus to cholera immunisation by means of vaccines, and the process is now in the forefront of anti-cholera measures. Most people with a large experience of the measure speak in terms of the greatest enthusiasm as to its efficacy—an enthusiasm which is shared by public health officials in certain countries of the Far East. It must be stated at once that nowhere was it possible to obtain statistics arising from scientifically controlled experiments designed to determine the degree and duration of the immunity conferred by various methods, or any method, of vaccination, but many suggestive facts were emphasised.

The relative freedom of Java from cholera during the past three and a half years is ascribed in great measure to the large number of vaccinations performed among the civil population of infected or threatened areas during the last epidemic manifestations of the disease in the island. This may be so, but it must be remembered that the disease has been practically absent from other parts of the Dutch East Indies, from Singapore, the Malay States, Formosa, during the past two years or more—countries where no such mass inoculations have been performed. Of more significance is the statement that, since cholera inoculation has been made obligatory for the large number of Mahomedan pilgrims that sail each year from the Dutch East Indies to Jeddah, cholera has been conspicuously and unprecedentedly absent from their midst.

Cholera vaccination as a prophylactic measure is likewise held in very high repute in French Indo-China. Here, cholera vaccination is now made obligatory by proclamation in any town, village or district which may be declared to be infected. Such vaccination also proved its value in connection with the despatch of Annamite labour forces overseas. Before the adoption of this measure the incidence of cholera infection had been high; after its adoption no further trouble was experienced. It was further stated that police and Government servants in Indo-China who are protected by inoculation have enjoyed a striking immunity to cholera in the presence of infection, though their environment and mode of life are in all respects comparable to those of the general population among whom they live.

Cholera vaccination has begun to be employed in British India. In organised labour forces it has been used to a considerable extent, but nothing like mass inoculation has been attempted among the civil population in cholera-infected areas. Certain areas of Bengal might afford unique opportunities for the estimation of the immunity afforded by cholera vaccination.

In Korea, cholera vaccination has been undertaken on a very large scale : in 1920 the cholera vaccinations performed numbered 5,242,469. It has also been used extensively in the Philippine Islands.

It should be noted that nowhere has cholera vaccination encountered the least opposition on the part of the native population : this is, in chief measure, accounted for by the absence of severe reaction, or any reaction, attendant upon the operation.

Most authorities are agreed that two inoculations are preferable to one. It should be noted, however, that the administration of two injections at intervals of a few days or a week among the civil population of Oriental communities is rarely possible and that most of the vaccinations on a large scale, referred to above, the results of which are appraised so highly, consisted of only one inoculation per person.

If only half of the claims made by enthusiasts on behalf of cholera vaccination be justified, the mastery of cholera is much nearer than any public health authority dared hope a few years ago. More extended trials as to the degree and duration of the immunity conferred by different methods of vaccination and the different types of vaccine in use are urgently necessary.

There is less to be said regarding the part played by shipping in the spread of cholera infection from port to port than there was in the case of plague, with which disease cholera presents such a striking contrast. In bubonic plague, rat-favoured merchandise is alone of great practical importance : the human being is of relatively small account. In cholera the human-being is all-important, and though it is most advisable to exclude "cholera-suspicious" cargo and water from an infected locality from departing vessels, the chief port health and quarantine measures have to be directed against the human carrier of infection.

In conditions as they are in the ports of the East, the danger of the introduction of cholera infection is in large measure confined to the deck passengers of ocean-going ships and to the crews of small coastal vessels which are difficult to control. Cabin passengers can be in most cases readily kept under surveillance. Moreover, they usually live in such conditions that, should they succumb to an attack, there is relatively small chance of infection being conveyed to others, and their illness is at once reported. Ports which supply emigrant labour are a danger should they become cholera infected. The occurrence of a cholera case on board an emigrant ship crowded with deck passengers or on a pilgrim ship is always a cause of anxiety.

It is very difficult to form any clear idea of the frequency with which cholera infection is introduced into the ports of those countries of the East in which the disease exists in endemic form, or of the amount of damage done by importation of infection in such ports. Infection clings with persistence to the purlieus of some of these ports, where it is no uncommon thing for cases of cholera to occur on board vessels moored in the harbour. This appears to be a more common occurrence in the case of river ports than of ports situated on the sea-coast, and may be due to contamination of the harbour water. Most countries that are dependent upon imported labour to any great extent possess quarantine stations at the ports through which such labour is admitted; these stations have done much to protect the countries concerned.

In certain countries in the East in which the disease is not endemic, all epidemics being dependent upon fresh importation of infection, cholera is far and away the most important of the ship-borne diseases and necessitates the most constant vigilance on the part of the port health staff. Japan is the best example of such a country, as its insular position excludes other than maritime channels of infection. Here measures in the past have been handicapped by the want of sufficiently prompt information regarding the first appearance of the disease in adjacent ports on the Chinese coast. Shanghai is considered locally to be the chief danger-spot to Japan on account of its propinquity and the very large amount of shipping that leaves that port for Japan direct. It is certainly true that Japan has suffered from outbreaks of cholera during each of the recent years in which Shanghai has reported cholera cases to any extent, but it has also suffered in years in which the disease appears to have been absent from the international settlement of Shanghai.

If the disease become unduly prevalent in Japan the danger to Korea at once becomes imminent; the experience of 1919 and 1920 shows how formidable cholera epidemics may become in Korea if infection be successfully implanted.

The task of guarding a long seaboard from cholera infection when neighbouring countries with which there is constant and unintermittent maritime communication by means of craft of all kinds and sizes become infected is prodigious, if undue interference with commerce be avoided. The risk is increased a hundredfold in the case of such a country as Japan, where the consumption of uncooked food is so large and where the intensity of cultivation necessary to support so large a population involves the application of untreated human excreta to the soil. A sea-port with modern sewage disposal and a protected water supply runs much less risk.

The Japanese authorities have done, and are doing, a prodigious work to safeguard their country, but even their efforts have failed to exclude infection. The difficulties arise not so much with the acute case, which is less likely to escape observation, as with the healthy carrier. The amount of work done in Japan in the search for cholera-carriers among arrivals from infected ports has been referred to elsewhere. In the severe cholera year, 1919, when the disease was unusually widespread throughout the East, 120,000 fæcal samples were examined in the port of Moji alone, resulting in the discovery of eight cholera cases and eleven carriers : these examinations were all carried out within a period of five months. This infinitely small percentage of positive findings is representative of the combined experience of all the Japanese ports; it illustrates the very great difficulty of carrying out cholera-carrier investigations, on a sufficient scale to give results of value, in any place other than an endemic focus of the disease or during severe epidemic prevalence. It does more than this; it compels a consideration of the question as to whether the results are commensurate with the labour involved and the inconvenience occasioned. Unfortunately, the data necessary for a decision are not available. It is impossible to estimate the number of carriers that arrived on the Japanese coast undetected and impossible to estimate the damage that might have accrued had not the eleven carriers been detected on arrival in Moji. The local authorities are insistent on the importance of carrying out such investigations, and they are in the best position to judge of the necessity.

The Japanese are the only port health authorities in the Far East who devote much attention to the search for cholera-carriers. In certain years, however, the Philippine Quarantine Service has done much work along these lines. The search for carriers was started as a routine measure in the ports of the Philippines in 1909. In other countries the measure is looked upon as either impracticable or unimportant. Nor would one advocate its adoption where habits of life are different and where very considerable security can be assured by sufficient attention being paid to the water supply and to the disposal of excreta.

The last matter calling for attention in connection with this consideration of cholera as a ship-borne disease relates to the quarantine station as an item of equipment of large ports in the East. All ports in the Far East with any claim to be considered "first class" are at the present time provided with quarantine stations, with the exception of the ports of British India and Hong-Kong, and nearly all these stations are adequate for the purpose for which they were constructed, though they vary very considerably with regard to the luxury with which they are furnished and equipped. It is probable that quarantine stations will be opened at the chief British Indian ports in the not-distant future. This decision has been prompted primarily by considerations regarding the risk of the importation of yellow fever. Here the matter is being considered from the point of view of cholera, and it is hard to understand how a cholera-infected vessel arriving in a port can be satisfactorily treated in the absence of accommodation for passengers and crew for a short period of time. The ever-existing possibilities of the introduction of cholera infection from the landward side of such ports does not appear to be sufficient justification for neglect of precautions against another probable source of infection. There are equally cogent arguments in connection with other diseases, all emphasising the urgent desirability of having such institutions at all large ports in the Orient. The time will surely come when unfortunate happenings in inadequately equipped ports will render quite unnecessary further verbal advocacy of the necessity of some form of quarantine station in large ports.

IV — SMALLPOX IN THE FAR EAST

From the point of view of the present enquiry there is much less to be said regarding smallpox in the Far East considered as a whole than there was about plague and cholera. Smallpox infection is certainly more widespread than either of the other two diseases, but the dangers of transferring infection by ship are confined almost entirely to such classes of passengers as labour forces and pilgrims. In view of the attention that is paid to vaccination in practically all large ports of the East, even this danger is not a very considerable one; moreover, most ports that receive immigrant labour forces are in possession of quarantine stations, where the deck passengers from an infected ship can be accommodated in case of need.

In certain parts of China the disease appears to be always present and is looked upon as one of the unavoidable ills to which flesh is heir. So much is this the case that the Japanese port health regulations enforced in the ports of Korea and South Manchuria do not regard smallpox as a dangerous infectious disease within the meaning of these regulations.

Most of the large ports of the Far East have a much lower smallpox incidence than one would expect, given the conditions in which the majority of the poorer classes live and the fact that infection is rarely absent. Primary vaccination is efficiently carried out in the vast majority of such ports, but in the Far East, as elsewhere, revaccination receives less attention than it merits, except perhaps in Japan.

The following table gives the total mortality attributed to smallpox during each of the past five years in the representative countries and places mentioned :

Smallpox Deaths.

Country or Port	Population	1918	1919	1920	1921	1922
Colombo	244,163	10	5	21	4	11
Bombay City	1,175,914	1,024	780	294	406	61
Bombay Presidency	19,165,614	8,063	6,232	3,536	1,771	
Calcutta	907,851	545	1,870	2,925	89	450
Bengal	46,522,293	8,576	37,010	36,190	8,157	7,864
Rangoon	341,962	95	656	120	18	72
Burma	13,212,192	750	3,917	2,853	987	1,439
Siam	8,477,539	15	19 under reported	26	102 (1)	
Bangkok	324,422	10	0	1	0 (1)	
French Indo-China	18,801,000	1,500	800	777	225	
Singapore	351,461	5	3	2	33	68
Federated Malay States	1,298,292	8		155	76 (cases)	2
Java	33,000,000	909	955	467	274	275
Hong-Kong	625,166	32 (cases)	27	34	191	212
Shanghai	840,000	111	1	0	227	240
Formosa	3,757,838	40	48	240	2	15
Japan	55,961,140	285	1,115	844	212	125
Korea	17,288,989	111	675	3,614	2,527	1,160
Manila	285,306	641	28	0	0	0
Philippine Islands	8,939,464	15,158	49,916	6,627	728	12

The most serious and widespread epidemic referred to in the above table was that which occurred in the Philippine Islands in 1918 and 1919. This was by far the most severe epidemic of smallpox experienced in the Philippine Islands since they passed under American rule. Vaccination had been very imperfectly carried out during the preceding years, as is evidenced by the fact that nearly 90 per cent of the fatal cases investigated were children who bore no marks of vaccination.

One outstanding feature of smallpox epidemics in the Far East is of considerable epidemiological interest : this is the constancy of the seasonal prevalence of the disease. In the Far East as a whole it may be said that at least three-quarters of the deaths attributed to smallpox are reported in the first half of the year : a similar phenomenon is observed also in parts of Europe. The only country in the Far East to which this generalisation does not apply is Java.

In the following table is set out the number of deaths attributed to smallpox in each month of the year 1919 in certain representative countries of the Far East. The year 1919 has been selected as the one in which smallpox was more in evidence than in any other year now under consideration. The figures for the Philippine Islands represent cases of smallpox reported : all other figures refer to smallpox deaths. It is most noteworthy that the outbreak in each of the countries mentioned—countries which exhibit an extreme diversity of climatic and other conditions —reached its height in the earlier months of the year.

(1) These figures are for the Buddhist years 2461 B. E. to 2464 B. E., the latter terminating at the end of March 1922. Cases of and deaths from smallpox in Siam are certainly inadequately reported.

Deaths attributed to Smallpox during each month of 1919.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Bombay Presidency. . . .	535	768	1,026	997	836	558	345	195	168	165	223	416
Bengal.	868	1,382	3,234	6,170	7,226	6,518	3,788	1,945	1,391	791	1,017	2,680
Burma.	168	419	735	783	650	426	269	138	79	98	63	100
Hong-Kong	2	6	3	9	4	2	0	0	0	0	0	1
Japan.	139	257	258	142	139	77	25	10	4	8	21	35
Philippine Islands (cases). .	12,552	15,096	17,350	12,979	9,070	5,794	5,548	4,603	3,731	2,480	2,071	1,394
Deaths for each quarter . .			21,724			15,344			8,991			3,857

In contrast to the above, the smallpox mortality in Java in each of the thirteen four-weekly periods of 1919 is of interest: 92; 62; 81; 52; 55; 64; 46; 81; 116; 107; 83; 78; 38. This distribution of fatal smallpox cases is fairly characteristic of the disease as it occurs in Java. Smallpox in Java is also characterised by a somewhat lower case mortality than is usually recorded in the East.

V — A SANITARY CONVENTION FOR THE COUNTRIES OF THE FAR EAST

The main object of the Far Eastern Mission was to obtain sufficient information regarding disease prevalence, port health procedure and port health equipment in the chief ports to enable suggestions being put forward as to the possibility of framing a convention governing port health procedure which would ensure the approbation and adherence of all Far Eastern countries. A study was to be made of the applicability, or otherwise, of the International Sanitary Convention of Paris, in its unratified revised form, to Oriental conditions; if found unsuitable, modifications were to be suggested which might render that Convention acceptable to countries in the Far East.

These questions were discussed at very considerable length in every country visited. The port health procedure in each country was studied as fully as possible in the time available. As much information as possible was obtained in each country regarding such epidemiological features of the chief "international" infectious diseases as had a bearing on the dangers of transmitting infection from port to port. It was realised that the latter task was as important as any, for without a detailed knowledge of the epidemiology of the diseases in question, as encountered in the East, no discussion of conventions could be profitable, either to the writer or reader of this report.

In this section of the report an endeavour will be made to summarise the results of this enquiry and to put forward suggestions which may serve as a basis for discussion and ultimate agreement on the part of those chiefly concerned.

It may be stated at once that the necessity of having some more uniform procedure than exists at present was recognised in all the countries visited.

Speaking generally, the countries in the Far East in which public health effort attracts attention are divisible into two categories. In the first there are those unfortunate countries which are the endemic home of most or all of the diseases considered in international sanitary conventions. The self-interest of such countries is naturally insistent that measures taken against ships from free ports are not such as would interfere unduly with commerce. The threat of importation of infection is, to them, a matter of secondary importance. In the second category are those countries in which some or all of these diseases are not endemic, but severe epidemics are likely to occur if infection, which persists in endemic form in countries so near at hand, escape the vigilance of the port sanitary authorities. The interests of these countries demand precautions which are not so vital to the countries of the first group.

Though this distinction exist, it would be unwise to exaggerate its importance. It explains in some measure the divergent attitudes adopted by different countries in discussions on the subject of sanitary conventions, but it should not be an impossible, or even a difficult, task to merge such divergent points of view. The commercial interests of all countries are similar in kind, if not in degree. It is realised everywhere that if port health and quarantine regulations impose too great a burden on free commercial intercourse, they will be honoured rather in the breach than in the observance. On the other hand, the exclusion of serious communicable disease from the large ports of the world is a matter of direct concern to commercial enterprise everywhere. At the best, port health regulations cannot legislate against possibilities; they cannot secure absolute safety if commerce is to continue, but they can, if they be based exclusively on well-established epidemiological facts, and so stripped of every non-essential, secure comparative safety and that with a minimum interference with commercial enterprise.

In the Far East, at any rate, sanitary conventions and port health regulations have an educative value in addition to the purpose they are primarily designed to serve. Too little attention has been directed to this matter, which is of no small importance. In discussing articles of port health regulations and sanitary conventions with experienced officials in the East, whose opinions are of very great value, one not infrequently hears some such expression as "I acknowledge that such a provision does do, and can do, no real good; but, after all, it does no harm; it occasions very little trouble, and other people or other countries want it; let it stand". A most emphatic protest must be entered against such an attitude. Conventions and regulations influence anti-epidemic activity in all manner of ways and in all kinds of places. Any false doctrine contained in such regulations may determine a false orientation of measures based thereon or influenced thereby. In the East this is a matter of paramount importance. Conditions, as they exist to-day in the East, impose such strict limitations to public health activity that the utmost that can be done at present can only produce conditions that will still fall lamentably short of any sanitary ideal. To misdirect the relatively little that can be done is rather worse than doing nothing : it brings public health activity into disrepute, it increases opposition to well-designed measures, and delays that sanitary evolution which is surely but very slowly taking place.

The above paragraph is the outcome of observations made in many countries. Public health activity not infrequently lacks sense of proportion. At times one can see praiseworthy intensive efforts being devoted to an end of relatively small importance, side by side with a curious neglect

of most glaring defects. Conventions and regulations can and should help to restore that sense of proportion within their respective spheres.

There are very few countries in the Far East in which the International Sanitary Convention of Paris is regarded with unqualified approval, even in its revised form, although all are unanimous that the revisions in Part I have effected very great improvements indeed. The original Convention seems, however, to have been looked upon with such unqualified disapproval that one frequently hears the opinion expressed that revision alone is insufficient to convert it into a really satisfactory document. All are agreed that the disappearance of articles in which three such dissimilar diseases as plague, cholera and yellow fever are treated together is all to the good, but certain articles of the revised text are still at variance with the epidemiology of the diseases as they are seen in the East. This remark applies almost exclusively to plague. The Paris Convention endows the human being with an importance that he does not possess in the East as a vehicle for the transmission of plague infection from port to port, and most vessels which have in the past done so much harm in spreading plague infection from country to country might still be designated "healthy" in the terms of the Convention.

Such considerations, though of great importance, are, however, matters of detail. The most important arguments put forward by critics of the Convention in its relation to oriental conditions are concerned with fundamental basic principles on which the Convention is based. The Paris Convention is designed primarily to protect the countries of the West from invasion by infection from the East. In the East, the centres of infection aremuch nearer at hand and the danger of transmission of infection ever present. The Paris Convention enters into considerable detail with regard to the measures which may be taken on the arrival of an "infected" or "suspected" ship in a port. Ships are classified as "infected", "suspected", or "healthy" according to the conditions found on inspection, uninfluenced by the health conditions prevailing in the ports of departure, provided a few, not always very necessary, precautions have been taken at such ports. In the Far East, however, the centres of infection are so near that all responsible port health officials feel that it is quite impossible to ignore the state of health at the port of departure of the vessel to the extent permissible under the terms of the Paris Convention. Furthermore, in the conditions prevailing in the East, with its enormous coast-line, innumerable ports and paucity of ports with complete port health equipment, it is incumbent that all possible precautions be taken at the "infected" or "suspected" port of departure. If such measures be adequate, facilities can be accorded to vessel to circulate freely.

It must be admitted that, even in the best circumstances obtainable, and given the faithful observance by all countries of the most stringent sanitary convention that is compatible with necessary commercial enterprise, certain parts of the Far East will still have to run greater risks than would be excusable in conditions as they are in the West.

When one comes to consider how such fundamental desiderata as those referred to above can be incorporated in the articles of a sanitary convention that is workable in present conditions, one is compelled to advocate the classification of the ports of the Far East in accordance with their port health organisation and equipment.

This classification of ports, rather than ships, into "infected", "suspected" or "healthy", and the further subdivision of ports into ports of the first, second and third classes, rule out of court any possibility of so modifying the present International Sanitary Convention of Paris as to make it applicable to Oriental conditions, though there does not seem to be any objection to incorporating a Far Eastern sanitary convention into the Paris Convention as a separate chapter, applicable only to countries in the Eastern arena which may wish to adhere thereto. The study as to how effect may be given to these proposals will be the object of the remaining paragraphs of this part of the report.

At the very outset of this discussion, one is faced by the facts that information regarding the appearance and prevalence of epidemic diseases in the ports of the Far East is not at present communicated to the countries directly concerned with sufficient celerity to secure safety, and that, without prompt notification, any convention would remain, in large measure, a dead letter. In most, if not all, of the important ports of the Far East there is machinery existent for the collection and publication of vital statistics and for the notification of cases of, and deaths from, infectious disease. Suggestions are put forward in the next chapter of this report as to how such statistical information may be made quickly available to all directly interested. It is proposed to create a Far Eastern Epidemiological Intelligence Bureau. The objects, work and constitution of this bureau are fully described elsewhere, and the matter is referred to here merely to emphasise the fact that the existence of such an institution is essential to the working of any intelligent system of international port health procedure in the East. To facilitate discussion of the matters now under consideration the reader is asked to postulate the existence of such an international intelligence bureau at some central port in the Far East.

At the present time, ports in the Far East are declared to be "infected" with some or other infectious disease by the local government concerned. In most cases, the occurrence in any week of a certain arbitrary number of cases of such disease justifies the declaration of a port to be "infected". When the weekly number of cases falls below another arbitrary figure, the port is then declared to be no longer infected. Any country in the Far East can declare any port in any other country to be infected with any disease, in so far as the port health regulations and procedure of the former country are concerned. Such a country may base its information upon consular reports or upon other sources, which are generally belated. As a result of this, a very anomalous state of affairs may arise which must be most confusing to the shipping industry. Thus, to take a hypothetical case, Manila might declare Saigon to be infected with cholera but not with plague; Java might say that Saigon is infected with plague but not with cholera; Singapore might consider Saigon to be free of both diseases. To prevent this anomalous and somewhat absurd state of affairs, it would be advisable, if possible, to leave the classification of ports into

"infected", "suspected" and "healthy" categories to a central international epidemiological bureau, which would take its decisions in accordance with rules laid down for its guidance.

Such rules require careful consideration. They must, from the very nature of things, be arbitrary, but fortunately there is a large amount of experience to aid us in fixing upon an arbitrary standard.

Dr. Brooke, the Port Health Officer of Singapore, has for many years past kept a very careful record of all vessels infected with plague, cholera and smallpox which have arrived at that port, and has marked such ships on a chart expressing the state of epidemic prevalence at the port of departure. These observations show that an infected vessel has never arrived in Singapore unless the reported incidence of the disease in question in the port of departure exceeded 25 cases per week at the time of departure. At first sight, the application of such an arbitrary standard to ports varying enormously in size and population is a most unscientific and unwarrantable procedure. In reply to this criticism, Dr. Brooke urges, and with considerable force, that the much larger amount of traffic that leaves the big port, as compared with the small port, greatly increases the risk of the spread of infection from the former, and although 25 cases a week may mean almost epidemic prevalence in a small town, and be relatively insignificant in a large one, the risk of contamination of shipping is about the same in the two cases. It is not a matter which lends itself to mathematical correlation, but one cannot ignore the results of careful observations that have been carried out over a number of years.

On the whole then, one is inclined to urge the acceptance of this arbitrary figure as a definition of an "infected port" for human diseases such as cholera and smallpox, but to reject it as altogether insufficient in the case of bubonic plague. It has been pointed out in the section of this report dealing with plague that the incidence of human plague frequently fails to be an adequate index of the rat epizootic. It may well happen that a ship receives plague infection from a port in which no human case has occurred within a long period of time, or ever occurred. It has further been noted that plague-infected ships are very frequently "healthy" ships according to the Paris Convention. Moreover, plague cases may occur on board a ship that is not infected, though such a ship would be either "infected" or "suspected" if that Convention were in force.

It is necessary, then, to find a "rat formula" for the classification of plague-infected, plague-suspected or plague-free ports.

In the terms of the Draft Convention which is reproduced below, it will be seen that an "infected" port of the first or second class is one in which 25 or more non-imported cases of dangerous communicable disease have occurred in the urban or suburban districts thereof during any one week ending on a Saturday at midnight; and, in the case of plague, the discovery of infection among the rats in any wharf or harbour area, including areas in which merchandise is stored, shall be sufficient to render such port infected.

It is proposed to define a "suspected" port as a port of any class in the urban or suburban districts of which a non-imported case of dangerous infectious disease has occurred, or in any urban district of which evidence of a plague epizootic has been discovered.

It is thought that the definition of an infected port given above should be applicable only to ports of the first and second classes. In ports of the third class, the occurrence of five or more deaths from a dangerous infectious disease should be sufficient to consider such port "infected".

It is necessary now to consider further the subdivision of Oriental ports into ports of the first, second and third classes respectively, the necessity for which has been mentioned above. This question has been very fully discussed with many authorities in the East as a result of which the suggestion is put forward that ports of the first class should be those which possess :

(1) A qualified and adequate health staff;

(2) Adequate apparatus for fumigation of large vessels at anchor;

(3) Trained staff and means for the capture and scrutiny of rats;

(4) A quarantine station suitable for detention and observation of deck passengers and disinfection of their effects;

(5) An adequately equipped bacteriological laboratory;

(6) An infectious diseases hospital;

(7) A satisfactory water supply;

(8) The machinery and legislation necessary for dealing with vital statistics, including the registration of cases of, and deaths from, dangerous communicable diseases.

Most, if not all, of the above stipulations can now be fulfilled in the ports of the Far East with any claim to being considered first class on the grounds of their commercial importance. Moreover, it is unlikely that any of the stipulations will meet with opposition in any quarter, save perhaps the necessity for having a quarantine station. This is a matter which calls then for further detailed consideration.

At the present time quarantine stations are installed at nearly all the important ports of the Far East, with the exception of Hong-Kong and the ports of British India. A list is attached of most of the large maritime quarantine stations now existing. Those that were inspected during the course of the tour in the Far East are marked with an a terisk :

Colombo*.	Macas ar.
Penang*.	Padang.
Port Swettenham*.	Bangkok.
Singapore*.	Saigon*.
Batavia*.	Haiphong*.
Surabaya*.	Manila*.
Belewan-Deli (Sumatra).	Cebu

Keelung*.	Nagasakai.
Shanghai*.	Fusan*.
Yokohama*.	Dairen*.
Kobe*.	Newchwang*.
Moji*.	

It would be impossible to describe in a short space these quarantine stations; reference has been made to them in those parts of this report which deal with the various countries visited. For the most part they are well designed and adequate for the purpose for which they were constructed. Some of them are unnecessarily large and expensive, or even luxurious. In character they vary from solid masonry structures, suitable for such a climate as that of Dairen, to the more or less open sheds which are alone necessary in the climatic conditions prevailing in the Malay States and the Dutch East Indies. Some are situated in picturesque sites, and are veritable health resorts, while others are somewhat congested.

It is, moreover, impossible to lay down in detail the accommodation and equipment necessary for such stations for all ports in the Far East considered as a whole. These must vary according to the nature of the trade of the port in question and other local circumstances. It can be said, however, that all should possess :

(*a*) Sufficient accommodation for the detention and observation of say 500 deck passengers and crew;

(*b*) Adequate disinfecting plant for the disinfection of clothes and effects of passengers and crew;

(*c*) Sufficient bathing accommodation, which, in a warm climate on the sea-coast, is not a matter that presents great difficulty;

(*d*) Some hospital accommodation for the isolation and treatment of cases of infectious disease, with temporary bacteriological laboratory equipment for use in case of need;

(*e*) Residential accommodation for the medical and other staff of the station.

The fact that so many ports in the East possess a quarantine station is almost sufficient indication of the necessity of such institutions in the trade and public health conditions prevalent in the Far East. No one would oppose the absolute necessity for such institutions were the threat of invasion of the East by yellow fever, of which so much has been heard in recent years, to become more imminent than it is at present. Yellow fever is a disease that has found very little mention in any part of this report, for the simple reason that it has never been introduced into Asia, but it would be well to emphasize once more the well-known fact that *Stegomyia fasciata* and other species of *Stegomyia* mosquitos are everywhere prevalent throughout the warmer parts of the East, certainly as far north as Hong-Kong and Formosa, and the prevalence is most marked along the sea-coasts. Should the quarantine stations be considered with regard to their suitability for housing yellow-fever patients and contacts, more or less elaborate precautions would be necessary to see that such stations are freed from mosquitos, a matter which is, in any case, a desirability in all stations that are situated in tropical or sub-tropical climates.

Quite apart, however, from the debatable risk of yellow-fever infection, a quarantine station would seem to be essential to the proper public health activities of any large Oriental port. No port that imports or exports labour forces or pilgrims can afford to be without one, and it is difficult to see how any port can deal satisfactorily with outbreak of cholera, smallpox or other similar diseases which may occur on board vessels arriving in the harbour without accommodation for the ship's complement for at any rate a short period of time.

It is understood that it is the intention of the Government of British India to install such quarantine stations at its more important ports in the near future; that these will greatly facilitate the port health activities of these ports there can be no doubt. It is to be hoped that Hong-Kong, the biggest port in the world from the point of view of the tonnage of shipping that enters the port, will in her own interests make similar provision in the near future.

It is suggested that ports of the second class cannot be expected to possess either a quarantine station or an apparatus for the fumigation of large vessels at anchor, but they should have an adequate health staff, an organisation for the catching and examination of rats, infectious diseases hospital accommodation, a satisfactory water supply, a laboratory, and the machinery for the registration of cases of, and deaths from, infectious diseases—in other words, items (1), (3), (5), (6), (7) and (8) of the list of essential provisions for a first-class port that has been reproduced above.

All ports other than those of the first and second class would be considered as third-class ports.

Certain of the provisions suggested as essential for first- and second-class ports may need more exact definition before adoption, but it would seem that the proposals are in sufficient detail at any rate for a preliminary discussion. The inclusion of a "safe and adequate water supply" in the list of essentials of a second-class port has been criticised in some quarters. In view of the prevalence of water-borne diseases in the East it appears essential that every port with claims to be considered even second class should have sufficient water of a quality above suspicion for the supply of the shipping that uses the port.

Having effected a division of the ports of the East into three classes according to a port health and public health standard, and having decided upon a definition of "infected" and "suspected" ports, there does not appear to be any necessity in the conditions prevailing in the East to attempt any definition of "infected", "suspected" and "healthy" vessels such as is done in the International Convention of Paris. The difficulties of the task are sufficiently evidenced by that Convention. In spite of the extremely great care with which those definitions have obviously

been drafted, no less than three articles in the revised text are devoted to a description of the sometimes very necessary measures that may be enforced on the arrival of a "healthy" ship into port before free pratique is given. It is probable that this anomalous misuse of the adjective "healthy" cannot be avoided if the subdivision of ships into three categories be considered essential. In the Far East, fortunately, no very useful purpose would be served by such definitions.

It would be sufficient if port health authorities be authorised to "take cognisance" of any vessel arriving in harbour from an "infected" or from a "suspected" port; to circumscribe the measures that might be taken in connection with such vessels, but, at the same time, leaving the port health officer such discretion as local conditions necessitate; and, finally, to determine the facilities and immunities that would be accorded vessels that had been treated adequately before departure from ports of the first or second class.

It may be argued that the procedure outlined need differ but very little in essentials from that provided for in the Paris Convention; thi is so, but from the "descriptive" or convention point of view the procedure now proposed appears to be less cumbersome and certainly no less effective, and is more in keeping with conditions as they are in the East.

It should be emphasised once more that in view of the very large number of ports in the Far East relatively unprotected from the health point of view, but to whom unrestricted import trade is a matter of prime necessity, it is more vital than it is in Western conditions to insist that all possible precautions to prevent the spread of infection be taken at the large ports of departure. In the faithful performance of such measures the large ports in the East have a great responsibility.

It will be remembered that some time previous to the despatch of a Mission to the Far East, the Government of the Dutch East Indies had put forward definite proposals regarding the desirability of having a Convention that should govern the port health procedure of the Far East. Invitations to a conference that was to have been convened in Batavia were issued. That conference was postponed *sine die*, chiefly on account of the fact that the Government of British India did not consider it desirable to deliberate on the terms of another convention at a time when it was taking part in the preliminary discussion of the revision of the Paris International Convention.

The action taken by the Government of the Dutch East Indies was no new move : it had been under contemplation for many years past. As long ago as 1912 medical delegates appointed by the Governments of the Dutch East Indies and of the Straits Settlements had met and considered the basis of reciprocal uniformity in quarantine matters, and had it not been for the war an agreement would doubtless have been arranged. The writer of this report was quick to profit by the results of these preliminary discussions, which were generously placed at his disposal. He has further been privileged to discuss the questions in great detail with Dr. Brooke and Dr. de Vogel, both of whom represented their respective Governments in the discussions of 1912. Dr. Brooke has further rendered great service by the preparation of the following draft convention, which has been used in discussing port health procedure with various health authorities of the Far East. Since it left his hands numerous additions and certain modifications have been introduced with the object of reconciling divergent views and conditions. In this latter task the writer has been very greatly assisted by Dr. Victor G. Heiser and Dr. de Vogel. Dr. Heiser has an unrivalled knowledge and experience of Oriental health conditions, and Dr. de Vogel's extensive experience of health activity in the Dutch East Indies has, likewise, made his co-operation most valuable. The approval of both these experts emboldens the writer to reproduce the draft convention with the considered opinion that it is admirably suited in form and scope to conditions prevailing in the Far East.

It has been drafted on the assumption that it might find a place in the International Sanitary Convention between Parts I and II, in which case the first article would be numbered Article 57, instead of Article 1.

SUGGESTED DRAFT

Part II. *Section* —. Governing Quarantine Procedure for the Far Eastern Arena.

Provisions to be observed by countries of the Far Eastern Arena which have signed the Convention, on the appearance of a dangerous communicable disease in their territory.

(1) *Article* —. For purposes of this section the following diseases shall be considered as dangerous communicable diseases : to wit, typhus, bubonic or rat plague, pneumonic plague, cholera, smallpox and yellow fever.

(2) *Article* —. For purposes of this section the incubation periods of the dangerous communicable diseases shall be considered to be : for plague, cholera and yellow fever each six days; for smallpox 14 days, and for typhus fever 12 days.

(3) *Article* —. For purposes of this section the discovery of one or more plague-infected rats amongst the local rat population, or the occurrence of a non-imported case of bubonic plague, shall be considered evidence of a plague epizootic.

(4) *Article* —. For purposes of this section ports shall be classified into three categories :

A. *Ports of the first class.* — Those at which the following eight conditions can be fulfilled, viz :

(1) Presence of qualified and adequate health staff.

(2) Adequate apparatus for fumigation of large vessels at anchor.

(3) Trained staff and means for the capture and scrutiny of rats.

(4) A quarantine station suitable for detention and observation of deck passengers and efficient disinfection of their effects.

(5) An adequately equipped bacteriological laboratory.

(6) An infectious diseases hospital.

(7) A safe and adequate water supply.

(8) The machinery and legislation necessary for dealing with vital statistics, including cases of, and deaths from, dangerous communicable diseases.

B. *Ports of the second class* shall be considered those at which conditions Nos. (1), (3), (5), (6), (7) and (8) are fulfilled.

C. *Ports of the third class* shall include all ports not classified as first- or second-class ports.

(5) *Article* —. For purposes of this section a suspected port shall be deemed to be a port of any class in the urban or suburban districts of which a non-imported case of dangerous communicable disease has occurred, or in any urban district of which evidence of a plague epizootic has been discovered.

(6) *Article* —. (*a*) For purposes of this section a port of the first or second class shall be considered an infected port when 25 or more non-imported cases of dangerous communicable disease have occurred in the urban or suburban districts thereof during any one week ending on a Saturday at midnight; and, in the case of plague, the discovery of infection amongst the rats in any wharf or harbour area, including areas in which merchandise is stored, shall be sufficient to render such port infected. In the case of yellow fever the occurrence of one non-imported case shall be sufficient to constitute a port of any class infected.

(*b*) The occurrence of five or more deaths from a dangerous communicable disease, other than yellow fever, in a port of the third class during a weekly period as above shall be sufficient to constitute it an infected port.

(7) *Article* —. A port shall cease to be considered a suspected port for any specified dangerous communicable disease when either: (*a*) it becomes an infected port for the same disease; or (*b*) no cases of the disease have been reported in the urban or suburban districts of the town during a period of two weeks; also when, in the case of plague, (*c*) no infected rats have been discovered in any urban or suburban district after careful daily search during a period of two months.

(8) *Article* —. It shall be incumbent on every signatory Government, after a port of the first or second class in its territory has ceased to be suspected for plague, to undertake the continuous and systematic collection and examination of rats in all port and harbour areas, including areas in which merchandise is stored, during a period of at least six months.

(9) *Article* —. A port shall cease to be considered an infected port for a specified dangerous communicable disease when for three consecutive weeks ending at midnight on a Saturday the total number of human cases of that disease in all urban and suburban districts shall have fallen (in the case of ports of the first or second class) to 15 or less than 15 cases per week, or (in the case of ports of the third class) to three or less than three deaths from such disease per week. Provided always that a plague-infected state at a port of the first or second class shall not be deemed to have ceased until a month shall have elapsed since the discovery of the last plague-infected rat in any wharf or harbour area, including areas in which merchandise is stored, careful search having been carried out in the meantime. In the case of yellow fever a port shall be considered healthy when two months shall have elapsed without the occurrence of a further case.

(10) *Article*—. A port which has ceased to be considered an infected port under the provisions of the previous article shall *ipso facto* be deemed to be a suspected port until it ceases to be a suspected port under the provisions of this section.

(11) *Article* —. Cases of dangerous communicable disease occurring in any part of the territories of the contracting countries or signatory Governments of the Eastern arena, other than at the ports of the same or the suburbs of such ports, shall not result in a suspected or infected declaration against any of the ports in the said country in which the dangerous communicable disease had been reported.

Should, however, such disease in the interior of such country be plague, it shall be incumbent on the Government of the said country to cause the disinfestation of all goods and merchandise likely to harbour rats which may leave the infected area before the shipment of such goods and merchandise from any of the ports of such territory.

Should passengers, other than cabin passengers, come from a territory in which cholera, typhus fever or smallpox prevails, measures shall be taken at the port of departure in accordance with the requirements of the Government of the port of destination, in so far as these are practicable.

(12) *Article* —. The nature of the goods or merchandise likely to harbour rats (plague-suspicious cargo) shall, for purposes of this section, be deemed to be the following, namely :

Rice or other grain (exclusive of flour); oilcake in sacks; beans in mats or sacks; goods packed in crates with straw or similar packing material; matting in bundles; dried

vegetables in baskets or cases; dried and salted fish; pea-nuts in sacks; dry ginger; curios, etc in fragile cases; copra; loose hemp in bundles; coiled rope in sacking; kapok; maize in bags sea-grass in bales; and bamboo poles in bundles.

(13) *Article* —. Goods or merchandise likely to convey the virus of cholera (cholera-suspicious cargo) shall, for purposes of this section, be deemed to be the following, namely :

Water (unless boiled, filtered, or certified as fit for consumption); fruit (unless properl canned or bottled); fresh vegetables; milk (unless properly sterilised and sealed); shellfish and sweetmeats.

(14) *Article* —. Every signatory Government of the Far Eastern arena must immediatel notify by telegraph to a *Central International Epidemiological Intelligence Bureau* situated a some Eastern port, hereafter to be determined, full details of the first recognised case of dan gerous communicable disease found in its ports or territory and the measures taken to prevent th spread of such disease. Such notification shall, in the case of ports of the first class, be followe by a weekly telegraphic notification to the bureau of all subsequent cases of the disease unt the disease is no longer epidemic or sporadic. Such telegraphic reports shall, in the case of port of the second or third class, be forwarded to the bureau with respect to each week at intervals of fortnight only. The weekly period with respect to which such reports shall be made shall b invariably deemed to end on a Saturday at midnight.

(15) *Article* —. Cognisance shall be taken by the signatory Governments of any ship durin her current voyage from ports in the Eastern arena which are suspected or infected ports; an also of ships during the current voyage from clean ports on board of which one or more cases c dangerous communicable disease has or have occurred and which ship has not been subsequentl dealt with by the competent health authority of a port of the first class; and also, in respect c plague and cholera infection, of ships from clean ports on board of which is carried plague suspicious or cholera-suspicious cargo respectively [*vide* Articles (12) and (13)] derived from a infected locality.

(16) *Article* —. The measures to be taken against ships of which the signatory Government take cognisance shall, generally speaking, be left to the discretion of the authorities at the por of arrival, observing only the following broad lines of policy necessary to secure some uniformit of quarantine procedure :

(*a*) All ships of which cognisance is taken shall fly the "Q" flag of the internationa code and await examination at an approved anchorage.

(*b*) Pratique to ships from a suspected port (not having a case or suspected case of dan gerous communicable disease on board) shall not be withheld beyond the time necessary t carry out the examination of papers, passengers and crew; and (at the discretion of the exam ining officer) to carry out efficiently the deratisation of the vessel and its contents.

(*c*) Ships from an infected port (not having had on board during the subsequent voyage an case or suspected case of dangerous communicable disease) shall nevertheless be submitte to such measures of inspection, surveillance, quarantine, or disinfestation as the conditio of the vessel, the nature of the disease, of the presence of deck passengers (1), may requir and determine.

Exception : Provided that, if the following conditions were secured, in the ade quately equipped port of departure, namely, that :

1. In the case of plague the ship and her holds and cargo were satisfactoril fumigated before departure;

2. In the case of smallpox all unprotected deck passengers have been vaccinate or re-vaccinated before departure;

3. In the case of typhus all deck passengers and their effects have been satis factorily deloused;

4. The incubation period of the disease for which the port was declared infecte is already completed;

then the said ship on arrival shall be treated as having arrived from a suspecte port only.

(*d*) Ships on board of which a case of dangerous communicable disease is present or ha occurred during the current voyage not having subsequently been dealt with by the healt authority of a port of the first class shall fly the letter "L" of the international code, i addition to the letter "Q", when anchoring at the approved anchorage. The measur which shall then be taken shall follow the procedure outlined in Articles 25 (cholera); 30 (ye low fever); 35 (typhus); 40 (movements of recalcitrant ships). With regard to smallpox, th measures which shall be taken shall follow the procedure in Article 36, except that all th measures shall be compulsory and not optional, and that all the passengers and crew wh are not sufficiently protected by recent vaccination or a previous attack shall be vacc nated or re-vaccinated, or evacuated and isolated, before the ship is admitted to pratiqu

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(1) In this section, inferior-class cabin passengers may be treated as deck passengers should the arrangements of their quarte and accommodation aboard, both sanitary and for association, indicate the necessity for such a procedure.

With regard to pneumonic plague the measures taken shall follow the procedure of Article 20. If bubonic plague be the disease in question the procedure described in Article 20 (1), (2) and (6) shall be followed.

(*e*) In the case of ships from clean ports carrying plague-suspicious cargo (Article —) from plague-infected localities, recognised means for rat destruction shall be applied at the approved anchorage before the discharge of cargo is permitted or pratique is given, unless such measures have already been adopted.

(*f*) In the case of the arrival of a ship of which cognisance is taken at any port of the second or third class, passengers and mails may be disembarked under whatever precautions may be considered necessary, but the discharge of plague-suspicious or cholera-suspicious cargo may be prohibited; and, if deemed advisable, pratique may be withheld from such ship until she has been effectually dealt with.

(*g*) Any ship of whatever origin, other than a man-of-war, arriving at any port of the first class and which has not been fumigated within the six months immediately preceding arrival shall be fumigated by approved apparatus before her departure from such port. In the case of vessels whose trade is confined to the Eastern arena three-monthly fumigation shall be imperative.

(*h*) Any ship other than a man-of-war arriving at any port of the first class shall have her drinking-water tanks cleansed and sterilised in a manner approved by the port health officer, unless evidence can be adduced that this has been done in a similar manner within the previous three months, and the tanks shall be refilled with water from a source approved by the port health officer.

(*i*) The departure of every ship of which cognisance is taken shall be notified by telegram to the port health authorities at the next port of call.

(17) *Article*—. The master of any ship leaving any port in the Eastern arena for a foreign port shall obtain a bill of health of the type set forth in the schedule hereto.

(18) *Article*—. Any ship leaving a port of the first or second class, or of the third class if possible, which has been declared to be an infected port, shall be inspected by a health officer immediately prior to her departure. This inspection shall include such examination of the vessel, cargo, passengers, crew, the personal effects of the passengers and crew, manifest of cargo and other papers, food and water supply, and the ascertainment of the ship's relations with the shore, the manner of loading, and the possibility of invasion by rats and insects, as will enable the inspecting officer to determine whether the requirements of this section have been complied with.

Vessels prior to storing cargo or receiving passengers should be mechanically clean in all parts, especially in the hold, forecastle, and the space occupied by deck passengers.

No communication with the shore shall be permitted after the completion of this examination.

In special circumstances a similar inspection shall be made at suspected ports of departure if requested by the country of the port of destination.

The results of these inspections, including specific details regarding the measures taken and non-compliance with any demand, shall be duly noted on the ship's bill of health.

(19) *Article*—. Any signatory Government of the Eastern arena which considers it necessary to prescribe special measures with regard to ships arriving from an infected country in the arena shall notify to the Central Epidemiological Intelligence Bureau the nature of such measures and the facilities that will be accorded such ships provided that certain specified measures be taken at the port of departure.

(20) *Article*—. The master of a ship that has been submitted to fumigation in compliance with the articles of this section shall obtain from the port health officer a certificate which shall contain information under the following heads : port and date; name of vessel; net tonnage; master; fumigated empty or in freight; preparation of ship; limber-boards raised; pipe casings opened; specific mention of each hold, engine-room, shaft alley, bunker, fore-peak, forecastle, store-room, galley, living-room, and any other space likely to harbour rats; the fumigant employed, gas generated, and its concentration in the various enclosed spaces; steps taken to destroy rats in lifeboats and other deck hamper; by whom inspection was made after fumigation; and the number of rats found dead and their location.

(21) *Article*—. With regard to other communicable diseases not coming within the scope of the articles of this section each signatory Government shall endeavour to apply to departing vessels such measures as may be requested by the Government of the country of the port of destination.

(22) *Article*—. Should experience show that the articles of this section are unsuited in any respect to conditions that may arise, or should it be found that they do not permit of the prompt application of additions to knowledge regarding the epidemiology and prevention of diseases created herein, necessary modifications may be introduced on the unanimous recommendation of the accredited representatives of the signatory Governments on whom this section is binding.

(23) *Article* —. Every signatory Government shall secure legal provision within its territories for the proper carrying out of the articles of this section, and for the incrimination of any master or other person who :

(*a*) Prevents a health officer from boarding his ship,

(*b*) Conceals from that officer the true state of health of every person on board,

(*c*) Refuses to answer or gives an untrue answer to any enquiry made by the said officer with regard to the sanitation or health conditions of ship, passengers or crew,

(*d*) Fails to produce ship's log or manifest of cargo or other ship's papers, on demand, to the said health officer,

(*e*) Fails to secure the presence of all persons on board when required for inspection and examination by the said officer,

(*f*) Prevents or attempts to prevent that officer from inspecting any part of the ship,

(*g*) Fails to obtain a bill of health,

(*h*) Fails to carry out the requirements of this section when requested to do so by the competent health officer.

P. S. — These articles should be numbered in their proper position and subsequent articles re-numbered.

* * *

Certain remarks are called for with regard to some of the provisions of the above Convention It will be noted that cognisance is taken of plague, smallpox, cholera, yellow fever, and typhus fever. Typhus fever has been retained because it may be of great importance to Japan, Korea, Manchuria and certain other parts of China. It apparently cannot exist in epidemic form in other more tropical parts of the Far East at sea-level.

Plague is subdivided into "bubonic or rat plague" and "pneumonic plague", the latter having special reference to the primary pneumonic plague epidemics that occur from time to time in Siberia, Manchuria and certain parts of Northern China. The justification for this subdivision is treated fully in the section of this report that is devoted to plague.

The definitions of "plague-suspicious cargo" and "cholera-suspicious cargo" contained in Articles (12) and (13) are of very considerable value in Eastern conditions: they direct attention to certain sources of danger, some of which are frequently overlooked.

It will be noted that the six-monthly fumigation of ships insisted on in Article (16) (*g*) follows the procedure of the International Convention. It is for consideration whether this fumigation should not be made three-monthly in the case of coastal vessels. The Government of the Dutch East Indies is insistent on the desirability of three-monthly fumigation for all vessels. This is obligatory at present in the case of vessels trading in the ports of the Dutch Indies and it is stated that the procedure does not entail undue hardships on shipping. Moreover, experience there has shown that the rat population of a ship may be very considerable on the expiry of three months from the last fumigation. Certain ports, *e.g.*, Manila, fumigate all ships that arrive from a port that has been declared to be infected with plague. There are certain ships that trade backward and forward between Manila and Hong-Kong that are thus fumigated certainly twice a month when Hong-Kong is infected with plague. Looking through the Manila register which contains the results of such frequent fumigations one can discover a few entries which indicate the possibility in certain circumstances of no less than 37 rats gaining access to a ship during a few days sojourn in such a port as Hong-Kong; such entries are not common, but they occur. The question may be left for the present with the recommendation that large ocean-going ships should be fumigated as frequently as is compatible with shipping interests but certainly at no greater intervals than six-monthly.

Certain considerations that emanate from the Dutch East Indies regarding the classification of ports into first, second, and third classes call for attention. It is urged that sometimes ports of an inferior class, when they become infected with certain diseases, may be temporarily equipped so that they are in a position to deal with ships that visit that port as satisfactorily as if they were ports of the first class, in so far as the particular disease is concerned. Thus, if a second-class port be infected with plague it may be possible to equip that port with apparatus for the satisfactory fumigation of ships at anchor and for the treatment of "rat-favoured" cargo. Similarly, in the case of cholera and smallpox, it is sometimes possible to supply the port with adequate staff and equipment to carry out all measures requisite for safety as long as the danger lasts. The general classification of ports into categories is not opposed; on the contrary, such a procedure is in accordance with the Dutch East Indies quarantine regulations, but it is urged that the temporarily equipped port should, from the point of view of the Convention, be considered as a first-class port for a certain specified disease, and as long as adequate measures are taken.

It is not easy to legislate for such matters in a convention, but it might be possible in the future to utilise the Far Eastern Central International Epidemiological Intelligence Bureau, described in the next chapter, to give effect to the proposal. Full details of the procedure adopted could be forwarded to the Bureau, which could then notify all Governments signatory to the Convention that such-and-such infected ports might be considered temporarily as ports of the first class in so far as some specified disease was concerned.

There are many important certificate and declaration forms used in the daily routine of a port health office, such as bills of health, declaration forms, pratique forms, fumigation certificates, etc. The only one of these of great importance from the point of view of the present enquiry is the bill of health; the others need not detain us. There does not appear to be any reason why pratique forms should be uniform in phraseology; this might be inconvenient. At times it is necessary to give a "modified pratique"; as a matter of fact, this is invariably done in the case of ships calling at Colombo. The desirability of having an informing and uniform fumigation certificate is dealt with in Article (20) of the above draft Convention.

The bill of health might be, and should be, a most important document, and it is most desirable that the same form should be in use in all ports in the Far East. At the present time the bill of health is frequently of little or no value. The forms used in certain ports appear to have been designed with the express purpose of withholding information.

On the whole, the two best and most comprehensive forms used in Far Eastern ports appear to be that of the Straits Settlements and the form prescribed in the quarantine laws and regulations of the United States of America, which is employed in Manila. The former is, perhaps, the better suited to conditions in Oriental ports and, subject to one or two additions and modifications suggested hereafter, it is recommended for general adoption. The form is as follows :

BILL OF HEALTH

Issued at the Port of . . . . . Fee . . . . . paid.

Description of Ship.

Name. . . . . .
Flag . . . . . Reg. tonnage . . . . . .
Surgeon. . . . . .
Captain. . . . . .

Past History.

First port of present voyage . . . . . .
Date of leaving port. . . . . .
Intermediate ports touched at . . . . . .
Infectious disease on board during current voyage to date :

Plague	Cases	Deaths . . . . .
Cholera	»	» . . . . .
Smallpox	»	» . . . . .
Yellow fever	»	» . . . . .

Number and causes of any other deaths . . . . . .

Present History.

Arrived on . . . . . .
Berthed at {wharf / roads} (not) fendered off and (no) rat-shields applied.
Cargo, nature of : . . . . . .
(Not) Disinfected in this port.
(No) Provisions / (No) Water } taken on board in this port.
Number of crew (including captain) on leaving this port . . . . . .
Number of passengers on leaving this port : 1st class. . . . . .
2nd and 3rd . . . . . Deck. . . . . .
Leave on . . . . . .in a {good / indifferent} sanitary state.
Destination. . . . . .

Health of this Port.

This port and its immediate environs are at present (not) infected (1) with

Non-prescribed cases during week ending. . . . . 19 . . :	Total from January 1st to date :
Plague	. . . . .
Cholera	. . . . .
Smallpox	. . . . .
Yellow fever.	. . . . .

I certify that the above particulars are correct to the best of my knowledge and belief.

Dated. . . . . 19 . .

. . . . . .
Port Health Officer.

---

(1) An epidemic is considered to begin whenever 25 or more infectious cases are first reported in any one week (excluding prescribed cases), and is considered to continue until the number of fresh cases reported, during each of three consecutive weeks, have fallen to 15 or under.

A *status sporadicus* is considered to begin when, for the first time, one or more cases (other than epidemic or prescribed cases) are reported in any one week; or when an epidemic has ceased, but cases are still being reported weekly. The disease is considered no longer sporadic when any two consecutive weeks have shown no reported case.

A "prescribed case" is defined as either :

(*a*) A case of infectious disease occurring amongst those incarcerated in a quarantine station, a gaol, an asylum or a reformatory.
(*b*) A case imported by ship or train and promptly isolated.
(*c*) A case occurring in a passenger during his or her quarantine surveillance.

The modifications to the form that are suggested are :

1. The addition of typhus fever to the list of diseases under "Health of the Port"; this disease is of importance to some of the countries concerned.

2. A statement should be included regarding the number of rats examined in the port and the number found to be infected with plague during the previous week, together with the date of the discovery of the last plague-infected rat in the port or harbour area, including stores from which produce is exported.

3. The subdivision of "plague" into bubonic plague and primary pneumonic plague.

To obviate the necessity of the first two paragraphs of the explanatory footnote, it would be sufficient to indicate the number of cases of infectious disease reported during the preceding week, without describing the port as "infected" or otherwise. The retention of some such designation as "non-prescribed case", with the definition of "prescribed case" in the footnote, is desirable.

The adoption by all ports in the East of a uniform bill-of-health form that is really informing would do a great deal to facilitate and to improve port health procedure in the Far East. It need hardly be said that the issue of bills of health should be the prerogative of the port sanitary authority.

The health authorities of the Dutch East Indies favour the issue of bill-of-health forms in book form to masters of vessels. They consider that this procedure would prevent the loss of an "inconvenient" bill of health by a careless shipmaster, and would facilitate the examination of the ship's papers by the inspecting officer. With the adoption of a uniform pattern this would be practicable and might be considered; it does not appear to be a matter of much importance.

There are two matters of great health importance in connection with the shipping in the Far East that are neither specifically referred to in this chapter nor discussed in any detail in any part of this report. The first is concerned with the Mecca pilgrim traffic; the second relates to the conditions in which emigrant labour forces are transported from and to certain countries in the Eastern arena.

The conditions in which the pilgrim traffic is carried on are regulated by other parts of the International Sanitary Convention; there the subject is treated chiefly from the view-point of the protection of Europe against the diseases of the East. In certain countries of the Far East the opinion was expressed that the protection of the health of the Orient from diseases conveyed by returning pilgrims has received too little attention in the Convention. The question is one of considerable importance but it does not come within the scope of the terms of reference of the present enquiry.

The shipping of labour forces from country to country is a vast world-wide trade, and certain countries of the Far East supply a large proportion of this emigrant labour. At the present time shipping ordinances and labour ordinances, in most, if not all, of the countries chiefly concerned, govern the conditions in which labour forces emigrate from and immigrate to the countries of the East. Bilateral conventions or agreements further control the traffic. Most of the countries whose industries are dependent upon imported labour possess adequately equipped quarantine stations. In spite of regulations, however, one does see from time to time ships in which the conditions for accommodating such deck passengers are open to criticism. The trade is one of great importance from the health point of view, and it might well be made the subject of an international convention in the future. In the framing of such a convention, shipowners interested in the traffic should be freely consulted. The enforcement of more stringent regulations in some countries han in others gives an unfair advantage to the shipowners of the latter.

VI — A CENTRAL INTERNATIONAL EPIDEMIOLOGICAL INTELLIGENCE BUREAU FOR THE FAR EAST

Among those who have given the matter careful consideration there is very little divergence of opinion with regard to the extreme desirability of devising some scheme whereby information concerning epidemic prevalence and cognate matters in the countries of the Far East, more especially in the ports, might be made more quickly and more readily available than it is at present, to all concerned. Information is at present obtained by countries of the East in various ways : bills of health, consular reports, reports from the health authorities of neighbouring Governments obtained by reciprocal agreement, reports from a medical official attached to the consulate of some foreign ports (an efficient means in certain circumstances, but one which obviously is incapable of general adoption), and newspaper reports—all contribute their quota of information. In spite of all these possible sources of information there are two facts that force themselves upon one's notice in a tour from port to port in the Far East. The first relates to the much larger amount of detailed information that is readily available in the majority of these ports than one had been led to imagine. The second relates to the relatively small amount of this important detailed information which appears to be in the possession of the health departments of neighbouring countries. In general, it may be stated that the health organisation and procedure of ports are held in less esteem by the administration of adjacent countries than they deserve. Over and over again expectations based on information acquired at the last port of call are falsified by what one finds on arrival.

The thesis that intelligent combined action to limit the spread of epidemic disease is almost impossible without prompt and precise information of the kind in question is sufficiently obvious. There are, however, other aspects of the question that have an importance scarcely less than that of the severely practical one referred to. Knowledge of the epidemiology of some disease based exclusively on the apparent behaviour of that disease in some small corner of the globe is apt to be very incomplete. Theories may be formed and acted upon the fundamental errors of which would have been self-evident had salient facts regarding the behaviour of the disease in other lands been available. What are regarded locally as problems difficult of solution are sometimes no problems at all in the light of experience gained in a larger field.

On the other hand, there are very few ports in the Far East where one cannot acquire facts of very considerable importance regarding the epidemiology of the more important communicable diseases, the significance of which is not apparent until comparison be made with the behaviour of the disease elsewhere. If all such facts as are now available could be collected and correlated, most important additions to our knowledge of such diseases would be obtained. There are very few places that have not something of importance to teach regarding these matters, and there are very few that have not something to learn from the experience of others.

The above, and numerous other considerations of a like nature, prompt the suggestions contained in this chapter of the report.

From statements made in the last chapter regarding a Sanitary Convention for the Far East, it will have been noted that it is proposed to create in the Far East, at some centrally placed and sufficiently important port, a central international epidemiological intelligence bureau, whose functions, immediate and prospective, will now be described. If it prove possible to bring such an institution into being in the near future, it is certain that its utility would be very quickly proved, given a sufficient backing by the countries most intimately concerned, and that, developing along lines that will be clarified by experience, such a bureau would soon be regarded as an indispensable adjunct to public health activity in the East.

Everywhere in the East it is recognised that the success of measures taken for the control, let alone the eradication, of infectious disease demands close international co-operation. That that indispensable co-operation will be forthcoming when called for there can be no doubt. The bureau that is foreshadowed here will enable a commencement to be made on a task that is of importance to the whole world.

The location of such a bureau will demand careful consideration. It should be centrally placed; it should have regular and frequent steamship communication with all ports of the arena; and it must, of course, have good telegraph and wireless facilities.

A glance at the map illustrating the Eastern arena that is reproduced at the commencement of this volume will show that Singapore, from its geographical position as the gateway to the Far East, in the centre of the arena, calls for first consideration as a possible site for such a bureau, quite apart from other considerations which indicate its suitability. The suggestion is therefore made that Singapore might with advantage be the port selected, without prejudice to the claims of other ports being considered.

If some such Convention as that outlined in the last chapter be agreed to and ratified, the bureau would have most important duties to perform.

1. It would receive cabled information regarding the first appearance of dangerous infectious disease in the territory of any of the signatory Governments, and the measures taken to prevent its spread;

2. It would receive cabled information once a week regarding the prevalence of the chief epidemic diseases in each of the first-class ports during the previous week, and once a fortnight similar information regarding ports of the second and third classes;

3. It would classify ports as "infected" or "suspected", as the result of such information received, in accordance with the rules laid down in the Convention;

4. Once a week it would cable to each signatory Government a summary of all the information so received, and other facts of sufficient importance.

A copy of this cable would be sent each week to Europe, to the Health Organisation of the League of Nations, which would arrange for the distribution of the information outside the Eastern arena;

5. Arrangements could be made for written reports, supplementing the information given in the cables, to be sent to the bureau periodically by the administrations signatory to the Convention. These would be collated and worked up in the bureau and the results sent by post to all signatory administrations and to the Health Organisation of the League of Nations at regular intervals;

6. It would receive regular reports as to the arrival of infected ships in any port in the arena;

7. It would be prepared at all times to supply information regarding, or make enquiries into, any questions concerning disease prevalence or control in the Eastern arena at the request of any signatory and with the concurrence of the countries concerned.

Such are the functions which this bureau might be expected to fulfil almost from the commencement of its career. Other duties which might eventually be entrusted to it will be referred to later.

The possibilities of such a bureau being installed for a term of years on an experimental basis through the agency of the Health Organisation of the League of Nations are worth very careful consideration. When established and having demonstrated its great utility, there will be little difficulty from the point of view of finance.

The Governments and administrations of the Far East signatory to the Convention will naturally demand control of an organisation peculiarly their own, and it is necessary to consider how such control might be effected. Some form of international advisory board would seem to be required, a board on which all signatory administrations should be represented. The first question that arises concerns the possibility of taking advantage of any existing medical organisation in the Far East to undertake this role.

One's thoughts immediately turn to the Far Eastern Association of Tropical Medicine. The object and constitution of this association, which was founded in 1908, are described as follows :

> "The object of this association shall be to promote the science and art of tropical medicine in the Far East. For this purpose the Association shall endeavour to unite into one compact organisation the medical profession of the Far East, for the growth and diffusion of medical knowledge; to promote a friendly international intercourse among physicians; to elevate the standard of medical education; to enlighten and direct public opinion in regard to the problems of hygiene; to form habits which may conduce to the prevention of disease among the native population; and to present to the world the results of such scientific observations.
>
> "The membership of this association shall consist of the members of all duly constituted, regularly organised medical societies within the field of this organisation, and all medical officials in the civil, military, naval or other organised services of Governments within their territories."

The Far Eastern Medical Association meets generally once in every two years at some port of the Far East—hitherto Manila, Hong-Kong, Saigon and Batavia have been the scenes of such meetings—and as this report is being written the fifth meeting is in session in Singapore.

In practice, the delegates attending the meetings at the F. E. A. T. M. are of two kinds : (1) medical representatives of the Governments in the Eastern arena, and (2) private medical practitioners belonging for the greater part to the town in which the meeting is held.

Should approval be given to these suggestions, a new field of usefulness would be at once opened to the bureau. In the first place it could function as the permanent office of the F. E. A. T. M., whose excellent work already accomplished might thereby be amplified and extended. In close co-operation with the Health Organisation of the League of Nations, it might initiate and co-ordinate enquiries of an epidemiological nature, and practical investigations into the relative efficiency of various anti-epidemic measures, to be carried out in the different countries of the arena. Examples of such problems that are now calling for combined investigation relate to :

1. The construction of "rat-free" stores and the study of the problem of eliminating the rat from stores and ships;

2. Further investigations into the methods of fumigation best suited for the small craft that ply in the ports of the East;

3. An enquiry into the species of rats and species of rat-fleas in ports and in ships;

4. Numerous questions concerning the epidemiology of cholera that have been referred to in the cholera section of this report;

5. The value of cholera vaccine as a prophylactic;

6. The delimitation of the endemic areas of epidemic diseases of chief international importance.

The above is sufficient to indicate the nature of some of the work of great importance to port health procedure that requires to be done. It would not be difficult to compile a list many times the length. Through the Health Organisation of the League of Nations, these enquiries could be co-ordinated with similar investigations carried out elsewhere.

Finally, the bureau would be of great assistance in arranging the details of such courses for the interchange of sanitary personnel as the Health Organisation of the League of Nations may be able to initiate in the Far East. It will be noted that this interchange of sanitary personnel fulfils in a practical manner the ideals enunciated in the "Object of the Far Eastern Medical Association", which have been reproduced above.

In viewing the future of such an organisation as the bureau, thus briefly described, with so much confident optimism, it might be explained that that optimism has been engendered by the more than generous treatment and willing co-operation that were extended to the writer everywhere throughout his long tour in the Far East. Difficulties will arise, but these will be easily surmounted. There is in the Far East a generous spirit of international co-operation in matters of public health already in existence, only waiting for a lead to accomplish much valuable constructive work.

It cannot be denied that there have been in the past numerous misunderstandings, explained sometimes by laxity of notification of the first appearance of infectious disease in some port or other, sometimes by the inadequate measures taken in the case of vessels leaving an infected port. As the health officers of all the ports in the Far East come to feel that they are parts of one widespread important organisation working for a common cause, such misunderstandings will be more and more rare.

In the Far East, at any rate, not much trouble need be anticipated on the score that Governments and administrations may hold back information regarding the prevalence of epidemic diseases. The futility of such proceedings is recognised better, perhaps, in the Far East than elsewhere. If the scheme so imperfectly described above can mature and develop, there will be as good an epidemiological intelligence service in the Far East as anywhere in the world. What this will mean in a part of the world that is the endemic home *par excellence* of some of the important scourges of humanity needs no elaboration.

The most important question of finance has been left almost to the last. It is hardly possible, at this juncture, to estimate the cost of this bureau with a useful degree of accuracy, but the annual expenditure is likely to approximate £10,000. The most important item of expenditure will be the cost of cabling, which will probably more than double all the remaining items of expenditure. In this connection it may be said that, if the Governments directly concerned will give the bureau the confidence and support it will merit, the total cost of cabling that will be incurred in connection with the spread of disease will not be in excess of that at present incurred by the individual Governments collectively. If the administrations in the East which at present send long weekly cables to Europe and elsewhere concerning the prevalence of epidemic diseases could be induced to trust this duty to the bureau—contributing to the bureau the sums thus saved—that bureau might be largely self-supporting from the commencement, and give in return reliable and complete statistical information. Should it be possible for the countries concerned to give facilities for the transmission of telegraphic reports by their wireless installations, either free or at reduced cost, the above estimate could be very materially reduced. The possibilities of broadcasting the weekly reports sent out from the bureau should also be considered. If the same day and hour each week were devoted to this work, broadcasting might be an efficient and cheap means of disseminating the information.

The inauguration of such a bureau need not necessarily await the ratification of the convention referred to. A convention such as the one outlined cannot function without a bureau of the kind described, but the bureau would greatly facilitate and improve the port health procedure at present being carried on. Once the bureau is installed it is certain that the ratification of some convention not very different from that outlined in a preceding chapter will obtain at no far distant date.

*
* *

In conclusion, it would be well to summarise some of the more important functions of the proposed bureau :

(I) It would carry out all the duties entrusted to it under the terms of the Convention;

(II) In addition to the telegraphic reports referred to in the Convention, the signatory countries would send to the bureau periodic and occasional reports concerning vital statistics and any general public-health matters likely to be of interest to other countries in the arena. This information the bureau would summarise in a convenient form and circulate as special reports and annual reports to all signatory countries and to the Health Organisation of the League of Nations;

(III) The Government of each signatory country which considers it necessary to prescribe special measures with regard to ships arriving from an infected country would notify the bureau of the nature of such measures, and of the facilities which would be granted, provided that certain stipulated measures were enforced before departure. The bureau would promptly circulate this information to the countries directly concerned;

(IV) It would supply information concerning, or make enquiries into, any question regarding disease prevalence or control in the eastern arena at the request of any signatory Government;

(V) The director of the bureau should be empowered to correspond directly with the chief administrative medical officer responsible for the port health procedure of the countries party to the Convention;

(VI) The official language of the bureau would be English, but certain publications would be issued in French or any other language in use in the East should the board so direct and determine;

(VII) The functions of the bureau would be enlarged along lines indicated by experience in order that it might become an important centre for the dissemination of epidemiological knowledge, for the standardisation of quarantine procedure and equipment, and for the control of communicable diseases generally;

(VIII) The expenses of the bureau would be met by the administrations signatory to the Far Eastern Convention in proportions hereafter to be determined. The countries to which the Convention and the bureau are likely to be of direct interest and importance are the following :

British India;
Ceylon;
Federated Malay States and the Straits Settlements;
Dutch East Indies;
Siam;
French Indo-China;
Brunei;
British North Borneo;
Timor Dilly;
Philippine Islands;
Hong-Kong;
Macao;
Formosa;
Japan;
Korea;
China and the China Treaty Ports;
Russia;

and, less directly :

Australia and New Zealand.

VII — SINGAPORE

Quite apart from its intrinsic importance as a port, Singapore was selected as a suitable starting-point for the work of the mission largely on account of its geographical position. Not only does it form the "gateway" for shipping to and from the Far East, but it lies at the very centre of maritime communications between ports of countries which, from an epidemiological point of view, are of world-wide importance. In short, the health conditions and quarantine arrangements at Singapore are matters of very considerable international concern.

The town and port of Singapore is situated on the south coast of a small island of the same name, 1° 15′ north of the Equator, in longitude 103° 50′. The island of Singapore, some 25 miles long and 15 miles broad, is separated from the southern extremity of the Malay Peninsula by a channel little more than a mile broad. A causeway, destined to link up the railway system of the Malay Peninsula with that of the island of Singapore, is in process of construction. On its completion, through railway communication between Singapore and Bangkok will be effected. At present all communication between Singapore and the mainland is carried on by boat.

The total population of the island of Singapore according to the census of 1921 is 417,859, of which no less than 351,461 reside within the Singapore municipal area.

The Town of Singapore.

The population of the town of Singapore is heterogeneous; its composition is as follows :

Chinese	274,261
Malays	34,377
Indians	27,690
Europeans	5,067
Eurasians	4,566
Others	5,500
	351,461

Within the last decade the population has increased more than 33 per cent—a fact that accounts for the serious overcrowding that exists in parts of the town. It is in large measure a migratory population, in constant change, and exhibits the abnormal age and sex distribution that characterises other Eastern industrial towns. The male members of the community, 237,537, are more than twice as numerous as the female, 113,924. This disparity in the proportion of the sexes is most marked in the case of Indians (23,287 and 4,403) and of Chinese (186,237 and 88,024).

As an example of the constant movement of population and the intimate contact with other parts of the East this movement entails, it may be stated that during the month prior to our visit, *i.e.* in November 1922, the arrivals by sea from foreign ports numbered 16,040 (11,276 Chinese) and the departures by sea numbered 17,379 (12,415 Chinese).

Births.

For 1921 the birth-rate of the town of Singapore was 29.12 per mille compared with the mean rate of 24.04 for the previous decade. When consideration is given to the abnormal sex constitution of the population referred to above, these rates appear extremely high. High as they are, a study of the figures indicates that they are probably an under-estimate. Thus, during 1921, for every hundred female births, 112.5 male births were recorded, figures which seem to indicate a deficiency in the registration of female births. Of 1,383 children born in hospitals in Singapore in 1922, 706 were males, *i.e.* 104.28 males for every hundred females, a normal ratio. In most parts of the East, male births are recorded with much greater accuracy than are female births. The registration of births in Singapore is each year attaining greater accuracy.

Deaths.

The death-rate of Singapore for 1921 was 33.99 per mille. Of the total 11,947 deaths recorded, 631 occurred among people who had been less than three months resident in Singapore. The deaths exceeded the births by 1,710. Below are given the death-rates for each of the previous ten years :

1911	50.91 (Malaria)	1916	29.26
1912	42.00	1917	35.75
1913	34.12	1918	41.08 (Influenza)
1914	34.11	1919	33.45
1915	27.39	1920	35.51
		1921	33.99
Mean rate for decade			36.35

The death-rates during the last decade are appreciably lower than those of the previous ten years. The relatively low rates registered in 1915 and 1916 appear to be attributable to the fact that a large number of old and decrepit immigrants were repatriated in the early years of the Great War, in anticipation of a possible food shortage in the colony. Excluding the figures for these two years and the high rate of 1911, when malaria figured prominently as a cause of mortality, the above death-rates show little variation from year to year in comparison with those of other large towns of the East in which fulminating epidemics are much more in evidence than they have been in Singapore.

The infantile death-rate, per thousand births, is decreasing but remains high. In 1921 it was 232.7, the lowest rate ever recorded. It was 248.9 in 1920, 261.7 in 1919 and 264.2 in 1918.

Before discussing the registered causes of death it is necessary to say something regarding the registration of vital statistics. Reference has already been made to the apparent deficiency in registration of female births. With regard to deaths there is a general consensus of well-informed opinion that the figures representing the total deaths from all causes and the crude total death-rate closely approach accuracy. Dead bodies could not easily be disposed of in any appreciable number in Singapore without registration, which is obligatory before the necessary sanction for the disposal of the body is obtained. When one comes to a consideration of the causes to which death is attributed, one is on much more doubtful ground—doubt that is not confined to places in the Far East. In this respect Singapore compares favourably with other Oriental towns. In 1921, 58.3 per cent of the total deaths were certified by "medical men", 5.4 per cent by coroners, and the remaining 36.1 per cent certified by registrars who receive information as to deaths either directly or through a police agency. Deaths in this last category are made the subject of enquiry by the medical inspectors.

It would appear, then, that the figures on which one can rely with confidence are those relating to the number of deaths, the date of death, and the sex and approximate age of the deceased. On the other hand, information regarding the cause of death must be studied with caution. The symptoms of the more serious epidemic diseases of the East, cholera, bubonic plague and smallpox, are so characteristic, however, and so well known to the population as a whole that it is likely that the number of deaths ascribed to these causes is a fairly close approximation of the truth.

In certain Oriental countries a study of the seasonal prevalence and age distribution of deaths enables one to obtain a fairly just estimate of the damage caused by each of the more important epidemic diseases; the seasonal prevalence of each of these diseases in many parts of the East is characteristic and constant and differs in the case of the various diseases. In Singapore one is deprived of this means of approach to the problem. It is scarcely an exaggeration to say that Singapore has no seasons, and disease shows little, if any, of its usual seasonal periodicity. The question of climate is referred to below.

The figures denoting the case incidence of infectious disease are worth less consideration than are those of deaths ascribed thereto. This is, of course, true everywhere : mild cases are always liable to be overlooked.

In the Straits Settlements the following infectious diseases are notifiable under the Quarantine and Prevention of Disease Ordinance 1915 : smallpox, cholera, plague, yellow fever, chicken-pox, diphtheria, membranous croup, erysipelas, puerperal fever, scarlet fever, typhus fever, enteric fever. To this comprehensive list of diseases, some of which never occur in the colony, have been added tuberculosis, influenza and cerebro-spinal meningitis.

The most serious causes of mortality in Singapore are of local rather than of international importance and less attention will be paid to them in this note than their intrinsic importance warrants. Of the 11,947 deaths registered in 1921, 1,497 were ascribed to "malaria", probably an overstatement; 1,644 to phthisis or pulmonary tuberculosis; 1,271 to "pneumonias"; 886 to beri-beri; 708 to infantile convulsions; 689 to dysentery, and 484 to fevers of uncertain origin.

All notifiable diseases together were responsible for 891 notifications during 1921, including 150 cases and 33 deaths from smallpox; 28 cases of plague, all fatal; one fatal case of cholera; 127 cases of enteric fever, of which 100 died; and 70 cases of cerebro-spinal fever.

From the point of view of the present enquiry, plague, cholera, and smallpox exceed all other diseases in importance, and their incidence and behaviour in Singapore will be considered in some detail; typhoid fever has also been persistently present.

Below is given in tabular form the number of cases and deaths attributed to each of these four diseases during each of the past thirty years.

Year	Smallpox		Cholera		Plague		Enteric Fever	
	Cases	Died	Cases	Died	Cases	Died	Cases	Died
1892	64	20	—	—	—	—	4	4
1893	119	69	7	7	—	—	9	9
1894	43	10	1	1	—	—	7	4
1895	17	3	430	318	—	—	16	15
1896	24	7	592	437	—	—	186	96
1897	38	17	54	44	—	—	55	44
1898	84	39	7	7	—	—	82	42
1899	316	103	3	3	—	—	88	28
1900	197	81	224	194	1	1	122	56
1901	47	12	133	120	16	14	112	54
1902	159	58	842	737	4	3	301	218
1903	109	30	226	184	3	3	148	64
1904	33	9	3	3	20	18	179	70
1905	20	11	16	15	19	19	233	95
1906	33	10	191	171	10	10	186	76
1907	8	2	205	187	15	15	353	134
1908	27	4	133	127	12	11	247	113
1909	41	7	82	77	5	5	235	83

Year	Smallpox		Cholera		Plague		Enteric Fever	
	Cases	Died	Cases	Died	Cases	Died	Cases	Died
1910.	415	135	132	130	5	5	84	46
1911.	254	84	235	235	33	32	152	100
1912.	59	29	121	114	38	32	126	74
1913.	19	6	97	79	1	1	111	65
1914.	13	3	274	211	15	12	109	69
1915.	18	7	9	5	34	31	89	53
1916.	70	20	13	8	23	18	103	42
1917.	33	7	8	7	45	42	120	57
1918.	11	5	—	—	176	161*	287	115
1919.	14	3	75	58	11	8	174	77
1920.	4	2	33	32	61	55	129	80
1921.	150	33	1	1	28	28	127	100
1922.	268	58	1	1	39	37	71	47

Plague.

The figures for plague set out in the above table are striking in many particulars. It will be noted that, though plague has been reported as being present each year since the beginning of the century, on only one occasion (1918)* has the annual total of either cases or deaths exceeded one hundred, and in only one other year has it exceeded fifty. In seven years the annual plague deaths have been less than ten. In other words, human plague has never prevailed in anything approaching severe epidemic form, though infection appears to have been constantly present and most certainly constantly introduced.

This relative immunity to plague that Singapore has enjoyed is common in greater or less degree to all the coastal territory lying on either side of the Bay of Bengal and to the islands and countries of the Far East as far north as 20° north latitude. It is a phenomenon of extreme epidemiological interest and importance and will be referred to again when the behaviour of plague in the ports of the Far East is being considered as a whole. Here attention is directed to a few facts of interest that emerge from a study of the plague history of Singapore.

It can be stated without fear of contradiction that the efforts made by the responsible health departments to control and eradicate the disease have been relatively of little importance in determining the surprisingly low incidence of plague. That remark must not be construed as unqualified adverse criticism of the authorities concerned, who would be among the first to endorse that opinion. Experience has so abundantly shown that there are in Singapore certain adverse conditions, climatic or other, or both, which effectively retard the epidemic evolution of plague; that the disease has very naturally come to be considered of very secondary importance to those responsible for safeguarding the health of the population of Singapore. From the local standpoint such an attitude is not only natural, but also defensible, if one considers the very serious local problems presented by the excessive prevalence of tuberculosis and the high infantile death-rate, for example. But, in view of the international importance of Singapore as a "junction" on lines of communication of world-wide importance, plague, in the town of Singapore, limited as it is in amount, appears to merit more attention than it has hitherto received.

One can consider, then, the evolution of plague in Singapore as a phenomenon uncomplicated by any serious attempt at its eradication or control. When reference is made to the absence of measures for the control or eradication of the disease the fact that bubonic plague is primarily and essentially a rat disease should be borne in mind. Plague cases are isolated, contacts are watched and at times inoculated, and houses are disinfected, but measures against the rat have been considered unnecessary, and rat destruction has not been undertaken for some years past.

During the present year (1922) 39 cases of plague have been reported, of which 37 died. During 1921 only 28 cases were reported (all fatal). There is no ground at all for questioning the diagnosis in these cases, which, for the most part, have been confirmed by very competent workers in a well-equipped laboratory.

The absence of any marked seasonal prevalence in the time distribution of these cases is exemplified in the following table :

	1921	1922
January.	—	5
February.	1	3
March.	5	8
April	7	9
May.	2	4
June.	4	4
July.	2	1
August.	1	2
September.	2	—
October.	1	—
November.	2	1
December	1	2
	28	39

With such small numbers and such a time distribution one is naturally compelled to consider the possibility of the cases having been infected elsewhere than in Singapore. There appears to have been no doubt, however, that all the cases were indigenous.

A further remarkable fact is that this very limited number of cases was drawn from scattered and widely separated parts of the town. The houses in which patients die are not necessarily those in which infection was acquired, but it must be confessed that in neither of the last two years

was there any evidence of there being only limited foci of the disease. One has to postulate, therefore, either a widely-distributed epizootic among the rats or repeated importation of infection from without. In the absence of any information regarding the disease amongst the rat population it is difficult to decide which of the two theories is the more tenable. Some of the parts of the town recently infected do not appear to be those most exposed to infection by means of imported merchandise. On the whole the balance of evidence favours the view that plague persists continuously among the rat population of Singapore.

Before discussing the matter in greater detail it would be well to refer briefly to the epidemic of 1918, when 176 cases and 161 deaths were reported—much the most severe outbreak experienced in Singapore. The last three months of 1918 appear to have been free of the disease, and only one case was reported in August and one in September. The remaining cases occurred as follows: January, 12; February, 51; March, 32; April, 21; May, 41; June, 10; July, 5. The outbreak was thus long drawn out. About three-quarters of the cases occurred within a radius of three-quarters of a mile from the mouth of the Singapore River; several of the earlier cases occurred in the rice godowns on the banks of that river. Infected rats were found on the premises in 28 cases, dead rats in ten cases and rat skeletons in four. Infected rats were found as follows: January, 1; February, 14; March, 29; April, 11; May, 4; June, 1; July, 3; September, 1, and October, 1.

During the three years 1918, 1919 and 1920 something was done in the matter of rat destruction and rat examination. The following summarises the results:

	Decumanus		Rattus		Concolor		Mice	
	Examined	Infected	Examined	Infected	Examined	Infected	Examined	Infected
1918	2,691	40	566	14	466	2	233	3
1919	514	—	125	1	148	—	75	—
1920	39	3	27	1	19	—	—	—

In addition 303 musk rats were caught and examined, but none were found infected.

An interesting feature of the above table is the marked preponderance of *decumanus*, which would appear to be more than four times as numerous as *Rattus rattus* and more than twice as numerous as *rattus* and *concolor* combined.

Without more detailed information regarding the manner in which these rats were caught little can be conjectured as to the relative frequency of the various species. A considerable proportion of the rats were brought in as the result of a reward that had been offered. It is always difficult to obtain reliable information as to the origin of rats obtained in this way. It is evident, however, that *decumanus* is widely prevalent in certain parts of the town. It is stated that in the commercial parts of the town rats are by no means frequent in the upper stories of the houses. This would imply that *decumanus* is practically the only species encountered in those parts of the town which, from a plague point of view, are by far the most important. If this be so it may well be that in Singapore the incidence of human plague is a very inadequate index of the intensity of the rat epizootic. A relatively small proportion of the inhabitants of certain parts of the town sleep on the ground floors, which in large part are used as rice godowns and general storehouses. Consequently the human population may come relatively little into contact with the rat population in the absence of *Rattus rattus* as an intermediary.

In the absence of precise information regarding such matters further speculation is hardly profitable. Enough has been said to indicate the importance of obtaining information regarding the rat infestation of Singapore and the flea infestation of the rats. It is a matter of much epidemiological interest and of considerable international importance (1).

It would be convenient at this stage to say something regarding sanitary conditions generally in the town of Singapore in so far as these appear favourable, or the reverse, to the propagation of infectious disease generally, and with special reference to plague. As is the case with most large towns, not only in the East, Singapore was built when town-planning was an unknown, certainly an unpractised, art, and with little apparent regard for what Singapore was destined to become. Narrow streets, several-storied dwellings with a narrow frontage, but of a prodigious depth from front to back; dwellings often constructed back to back; overcrowding that is continually becoming more difficult to cope with; deficient ventilation—all this characterises certain considerable portions of the town. For the greater part, hand removal of night-soil is still necessary, pending the further extension of the water carriage system of drainage now being installed, and the latrines are generally in unpleasant proximity to the kitchens. It must not be inferred that it is all as bad as this. One sees on all sides evidence of the progress being made by an efficient health department in coping with a task of enormous difficulty, but enough remains to make one wonder how it is that Singapore remains as healthy as it does. It would be a much easier task to write a report explaining the undue prevalence of almost any disease in the conditions pertaining than it is to explain the relatively extremely mild prevalence of certain communicable diseases. A very good system of surface drains and efficient scavenging of streets, a good water supply and a plentiful rainfall are doubtless factors of importance in the betterment of health conditions. In addition to this, a relative absence of dust due to a well-distributed rainfall and good road construction, a remarkable scarcity of house-flies (when compared with some other Eastern towns) and careful attention to food supply in markets, etc. are all noteworthy.

As for conditions favourable to rat infestation, there is shelter and food for rats in abundance in all parts of the town, and it would indeed be surprising if the town were found to be little

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(1) Since the above was written rat examination has been recommenced and has revealed the existence of an epizootic along the banks of the Singapore River.

rat-infested. True it is that the floors for the most part are constructed of impermeable material, a condition that would facilitate the prosecution of active rat-destruction measures, but not of great moment when the rat population is as free from molestation as it is at present. The open drains and gullies afford admirable shelter for *decumanus* (*Rattus norvegicus*). The manner in which grain, chiefly rice and padi, is stored is not free from criticism. The stores on either side of the Singapore River are referred to in another part of this note.

Though a matter of less concern to the subject-matter proper of the enquiry than those under discussion, it would be a grave omission to refrain from some mention of the truly admirable measures that have been, and are being, taken by the municipal health department to reduce the prevalence of malaria and mosquito prevalence generally. Considerable sums of money have been expended on well-designed plans, with benefits to health and comfort that are already very apparent.

Smallpox.

The table reproduced above shows that in none of the last twenty years has Singapore been altogether free from smallpox. During 1922, 268 cases were recorded, as compared with 150 in 1921 and 50, the mean incidence for the previous decade. During the recent epidemic, house-to-house vaccination had a remarkable success; no less than a third of the total population of Singapore were either vaccinated or re-vaccinated. At the present time Singapore is a very well-vaccinated city. In view of the large number of immigrants each year, to which reference has been made, the introduction of smallpox infection must remain a probable contingency, but the energetic measures taken by the port health and municipal authorities are sufficient to safeguard the vital interests of the town and shipping in this respect. Reference is made elsewhere to the frequency of smallpox infection on returning pilgrim ships.

Cholera.

During only one year (1918) of the last twenty has Singapore been completely free from cholera, but only one case was recorded in 1921 and only one in 1922. In view of the extensive trade and communications of the port of Singapore with other infected regions of the East this freedom of the town from cholera is surprisingly satisfactory. During 1921 and 1922 no cholera case was removed from ships. The municipal water supply of Singapore is good. Two large reservoirs in the centre of the island receive water from a catchment area that is free from dangers of serious animal pollution. A portion, but not all, of the water from these reservoirs is filtered through slow sand filters : the regular examinations made in the municipal laboratory show that the water as delivered is consistently of a high degree of purity. A project is on foot to increase the water supply from a catchment area on the mainland, whence water will be brought to the island on the railway causeway now being constructed. Anti-cholera vaccination has never been practised on any extensive scale in Singapore.

Cerebro-spinal Meningitis.

This disease has received considerable attention during recent years in the Straits Settlements. It was first noted in Singapore in 1917, when seven cases occurred in a British regiment which had arrived from England. In 1918 there were five cases notified; in 1919, 22; in 1920, 29, and in 1921 no less than 70. It is a notifiable disease in Singapore and a "dangerous infectious disease" from the point of view of port health administration.

Typhus and Relapsing Fevers.

Louse-borne infections are conspicuous by their absence from Singapore. One does not expect to encounter typhus fever, given the climatic conditions prevailing, but the apparent complete absence of relapsing fever is noteworthy.

Yellow Fever.

Yellow fever, of course, has never been seen in this part of the world. *Stegomyia fasciata* is abundantly present, though in certain parts of the town the efforts made by the anti-mosquito section of the municipal health department have markedly reduced its prevalence.

Influenza.

Singapore suffered, in common with most countries of the world, from the influenza epidemics of 1918, but, in comparison with the terrible experiences of some other Oriental countries, Singapore was extremely fortunate. As in other countries, there were two epidemic waves of influenza in 1918, the first commencing in June (May?); the second reached its height in October. The deaths attributed directly to influenza in 1918 are obviously of little value in estimating the severity of the epidemics, but from the monthly incidence of total deaths one can estimate

approximately the mortality—the relatively small mortality—occasioned thereby. The total monthly mortality figures for 1918, for the Singapore municipal area, were as follows :

1918	Deaths	Death-rate	1918	Deaths	Death-rate
January	1,035	39.68	July	1,339	51.33
February	879	33.70	August	920	35.27
March	865	33.16	September	792	30.36
April	978	37.49	October	1,801	69.05
May	1,182	45.31	November	1,323	50.72
June	1,162	44.55	December	896	34.35

Medical Organisation of the Straits Settlements.

The medical organisation of the Straits Settlements is quite separate and distinct from that of the Malay States.

The Straits Settlements consist of the following settlements, which together form a British Crown Colony :

	Population
Singapore	417,859 (Census 1921)
Labuan	5,909
Penang	162,310
Province Wellesley	130,335
Dindings	11,927
Malacca	153,599
	881,939

The medical administration of the Settlements is under the direction of a Principal Civil Medical Officer, directly responsible to the Government of the colony, who also acts as Registrar-General of Births and Deaths of the Settlements. Each of the Settlements has a medical or health officer acting under the P. C. M. O.

The port health officer of Singapore is also the Chief Health Officer of Singapore Island, outside municipal limits.

The Municipal Health Department of Singapore enjoys a large measure of autonomy; it is responsible to the Municipal Council but not directly to the P. C. M. O. of the Settlements. The Municipal Health Department is in charge of the health and sanitation of all areas in the municipality excepting Government institutions, but including the Harbour Board areas of the town, which are outside the sanitary jurisdiction of the Port Health Authority. This somewhat anomalous state of affairs appears to be due in part to the absence of any hard-and-fast line of demarcation between port areas and ordinary municipal areas. It is not within the province of the undersigned, to criticise, adversely or otherwise, the arrangements in force. As things are, the necessity for the closest contact and co-operation between municipal and port health administrations is too obvious to require emphasis. The health conditions of a town such as Singapore are much more than of local interest and importance : they are of international consequence and so become a matter of great moment to the Government of the Colony.

The Municipal Health Department is in the charge of a Chief Medical Officer, with one deputy and two assistant medical officers of health. There is also a medical officer in charge of the Municipal Bacteriological Laboratory and an officer in charge of the analytical laboratory. All the above are, at present, Europeans. There are also one chief sanitary inspector, two divisional inspectors, and 25 sanitary inspectors; three registration of births and deaths inspecting officers; a vaccinator; the complete staff of an infectious diseases hospital; two assistants in the "Anti-Mosquito Department"; four nurses in the Midwives and Infant Welfare Department; and an adequate staff for the management and inspection of markets, slaughter-houses, etc. This enumeration of staff serves as an index of the activities of the Municipal Health Department of Singapore.

Meteorological.

The climate of Singapore is characterised by an almost total absence of seasons; a daily range of temperature that rarely, if ever, exceeds 14° F.; a well-distributed rainfall, and a percentage humidity that is constantly between 80% and 90%. Because of the excessive humidity the heat is much more trying than the temperature figures alone would indicate. The data below are for the year 1921 :

	Temperature (Fahrenheit)			Rainfall (millimetres)	Relative Humidity per cent
	Max.	Min.	Mean		
January	85.8	73.2	79.7	421.50	83
February	86.6	73.2	80.4	213.75	81
March	88.1	74.2	81.7	226.50	81
April	88.5	74.9	83.1	202.75	81
May	84.5	77.9	81.4	175.25	85
June	83.1	71.7	81.2	143.50	83
July	85.0	77.9	82.6	156.00	80
August	85.0	78.4	81.9	152.50	80
September	86.4	77.5	80.0	212.00	82
October	84.1	77.1	79.7	384.75	81
November	84.0	76.6	81.2	257.25	83
December	84.2	76.4	81.1	122.00	82

With such conditions as those exemplified it is not remarkable that the seasonal prevalence of epidemic diseases is not much in evidence. During the first half of the year the daily range in temperature is most marked, and the nights tend to be somewhat cooler. It was during the first half of the year that plague was most in evidence in 1918, the only year in which more than a hundred cases of plague were recorded in Singapore.

The Port of Singapore.

The port of Singapore was in 1921 the sixth largest port in the world, estimated on the basis of the tonnage of ships in and out. During 1921, vessels arrived from 265 ports. A study of the list of these ports demonstrates the world-wide nature of Singapore's trade, and emphasises the importance of efforts made by its Port Health Authority to control the spread of epidemic diseases.

The gross value of Singapore imports and exports during the five years 1917 to 1921 was as follows :

	1917	1918	1919	1920	1921
Imports.	$ 527,980,306	576,165,300	727,007,589	890,079,401	484,801,685
Exports.	$ 491,848,849	496,636,878	720,347,211	724,270,614	415,808,295

It is not, however, the extent of its import and export trade that endows Singapore with its great importance as a port. The value of goods in transit that pass through the port is much more considerable, and as a port of transit Singapore is of international importance.

From the public health point of view, the large volume of immigration and emigration that takes place annually through the port is of prime importance and calls for constant vigilance. The pilgrim traffic to and from the Hedjaz likewise demands much care and attention. The total number of immigrants from China during each of the last five years was as follows :

1917.	155,167
1918.	58,421
1919.	70,912
1920.	126,077
1921.	191,043

Compared with these figures, the number of Indian immigrants into Singapore is inconsiderable. Most of the Indian immigration movement takes place through the port of Penang.

The port health arrangements in Singapore are in charge of a port health officer, with two assistant health officers and an adequate subordinate staff. There is a well-equipped quarantine station on the island of St. John, which lies about four miles south-west of the centre of the harbour area. Two disinfection launches (Clayton apparatus) are continually in use for the fumigation of ships.

During the year 1921, 1,851 visits were paid to ships by officers of the Port Health Department, and the number of crew and passengers examined amounted to 153,719 and 358,028 respectively : 232 immigrant ships bringing coolies from Amoy, Swatow, Hong-Kong and Hoihow arrived during 1921. All these ships were boarded by members of the health staff and 182,275 immigrants were examined. Three of these immigrant ships were infected : one from Hong-Kong was infected with smallpox, and one each from Hong-Kong and Swatow were infected with cerebro-spinal meningitis.

Eleven pilgrim ships were inspected when passing through Singapore, and five of these ships were found to be infected with smallpox. The pilgrims inspected on these ships numbered 9,316. In addition to these, 12 pilgrim ships started from Singapore carrying 9,864 pilgrims; these were all examined at the wharf and bills of health were issued in each case. The two disinfection launches referred to above were used on 731 occasions during 1921 for the fumigation of infected ships or of ships requiring fumigation immediately before departure.

Bills of health to the number of 2,951 were issued during the year : 740 disinfection certificates were also issued.

During the year 1921, eighteen ships arrived in Singapore infected with the following diseases :

Port of Departure	Smallpox	Influenza	Cerebro-spinal Meningitis
Hong-Kong	4	—	1
Madras	—	—	1
Surabaya	1	—	—
Bombay.	1	2	—
Jeddah	4	—	—
Penang	1	—	—
Indragiri	1	—	—
Singapore	1	—	—
Swatow	—	—	1
	13	2	3

A list of the ports which were declared by the Singapore authorities to be either "infected" or "suspected" during 1921 is given below. The exact significance of these two expressions "infected" and "suspected", according to the Singapore quarantine regulations, is described on a later page.

Name of Port	Infected (Disease and Period)	Suspected (Disease and Period)
Bangkok		Cholera 19. 10. 20—4. 11. 21
Batavia		C. S. M. 29. 10. 20—31. 12. 21
Belawan Deli		Cholera 14. 10. 21—21. 10. 21
Bombay	Influenza 5. 3. 20—27. 8. 21	
Bombay	Plague and Smallpox 29. 4. 21—27. 8. 21	27. 8. 21—9. 12. 21 Cholera, Plague and Smallpox
Calcutta	Cholera 3. 1. 19—31. 12. 21	
Colombo	Plague 31. 12. 20—27. 5. 21	
Hong-Kong		C. S. M. 1. 4. 21—23. 9. 21
Formosa	C. S. M. 20. 5. 21—31. 12. 21	
Keelung	Cholera 19. 9. 19—18. 2. 21	
Kobe	Smallpox 21. 3. 19—18. 2. 21	
Kobe	Influenza 13. 2. 20—18. 2. 21	
Kobe and Osaka	C. S. M. 15. 5. 18—18.2 .21	
Madras	Cholera 4. 3. 21—29. 4. 21	Smallpox 29. 4. 21—31. 12. 21
Negapatam		Cholera 24. 3. 21—29. 4. 21
Osaka	Influenza 13. 2. 20—18. 2. 21	
Rangoon	Plague 24. 3. 21—31. 12. 21	Plague 26. 11. 20—24. 3. 21
Saigon		Cholera 20. 5. 21—31 12. 21
Semarang		Plague 16. 1. 20—31. 12. 21
Surabaya		Plague 26. 3. 20—31. 12. 21
Vladivostock	Plague 2. 6. 21—31. 12. 21	
Yokohama	Influenza 13. 2. 20—18. 2. 21	

The following is a summary of the shipping work performed by the Port Health Department, Singapore, during the last five years :

Year	Crew and passengers examined	Passengers sent to St. John's Quarantine Island	Visits to Vessels	Bills of health issued	Smallpox cases treated	Cholera cases treated	Plague cases treated	Calf-lymph vaccinations at St. John's
1917	277,442	78,881	694	1,915	28	5	—	12,733
1918	284,198	24,182	1,709	2,086	—	2	—	5,143
1919	411,921	28,318	2,130	2,160	—	37	—	3,501
1920	507,176	31,991	2,023	2,878	—	14	—	1,324
1921	511,747	8,950	1,851	2,951	32	—	—	7,124

The quarantine station is situated on the island of St. John, which has been most admirably adapted for the purpose. Its main function is to provide accommodation for deck passengers removed from infected vessels arriving in the harbour of Singapore and their disinfection.

The island is nearly one mile long, its width varying from a quarter to three-quarters of a mile. It is provided with a large plant for distilling sea-water whence the distilled water is pumped to a reservoir on the highest point of the island. There is a large baggage shed communicating by trolley lines with the landing jetty and the disinfecting plant. All the disinfecting apparatus is in good working order : facilities exist for disinfection by means of either steam, sulphur dioxide or formalin.

The hospital accommodation of the island is separated from the barracks in which the contacts and suspects are housed. There are separate wards for each of the more important epidemic diseases. The barracks for the contacts are 22 in number; they have concrete floors and verandahs. Accommodation could be provided on the island for as many as 6,000 suspects at a time. Latrine accommodation and surface drainage are both unusually satisfactory. There is a burial ground on an adjacent small island.

The whole island has a well-cared-for appearance, and the thoughtful care that has been devoted to its design and upkeep is abundantly apparent.

It will be seen from the table reproduced above that the number of passengers accommodated on the island of St. John during the year 1921 amounted to 8,950, a considerably lesser number than usual: 1921 was relatively a very healthy year in the ports from which Singapore draws her immigrant labour population. Of the above number, 311 were admitted to hospital, of whom 69 died. There were no cases of either plague or cholera during the year. Smallpox was responsible for 32 admissions into the hospital, eight of whom died. These smallpox cases all occurred among pilgrims returning from Mecca. There were 7,124 vaccinations performed during the year.

The legislation regulating the work of the Port Health Department in the port of Singapore is contained in : (1) "The Quarantine and Prevention of Disease Ordinance, 1915", and the rules made thereunder; (2) "The Merchant Shipping Ordinance, 1910", and the rules and regulations made thereunder; and (3) "The Labour Ordinance, 1920".

Together this represents a very large mass of literature, somewhat difficult to condense into sufficiently small space for the purpose of this report. It may suffice if the general guiding principles on which this legislation is based be briefly described, and a few remarks be offered regarding the manner in which the regulations are observed in practice.

As a preliminary it is necessary to reproduce certain definitions as they appear in the enactments of the Straits Settlements.

" '*Epidemic state*', means the occurrence for the first time in any one week in any port of 25 or more cases of a dangerous infectious disease, other than prescribed cases; and the epidemic state shall be deemed to have ceased when for three consecutive weeks the number of cases has fallen to 15 or less than 15 per week".

" '*Sporadic state*', means: (*a*) the occurrence for the first time in any one week in any port of one or more cases of a dangerous infectious disease other than epidemic or prescribed cases; or (*b*) the persistence of cases after the cessation of an epidemic; and the sporadic state shall be deemed to have ceased when no fresh case other than a prescribed case has been reported for two consecutive weeks".

"'*Prescribed case*' means either: (*a*) a case of a dangerous infectious disease originating in a quarantine station, a gaol, an asylum or a reformatory; (*b*) an imported case by ship or train, which has been immediately isolated in a quarantine station or infectious diseases hospital; or (*c*) a case occurring in a new arrival during the period of his quarantine surveillance".

If reports indicate the existence of an "epidemic state" in any port, as regards smallpox, cholera, plague, yellow fever, typhus, cerebro-spinal fever or any other disease which may be hereafter included in the list, such a port is notified in the *Gazette* as an "infected port". Similarly a port is notified as a "suspected port" when returns indicate the existence of a "sporadic state" therein.

These somewhat arbitrary definitions are at first sight somewhat hard to defend and very easy to criticise adversely. They appear to be too rigid, and in the case of plague they assume that human cases of plague are an accurate index of the intensity of a rat epizootic. It might well be that in the dock areas of certain ports an intense epizootic of plague might exist, and prove of great danger to shipping, without being evidenced by human cases sufficient to constitute a "sporadic state", let alone an "epidemic state", or even any human case at all. Examples of this could be cited.

In spite of these and other obvious criticisms the writer is not prepared to stigmatise these definitions and the procedure based upon them as unjustifiable. The matter is one that calls for careful consideration. The definitions were the outcome of observations made by a most competent and careful observer, an official with a very extensive experience of port health work and administration. As the result of many years practical experience it was found that infected ships need never be feared unless an "epidemic state", as defined above, existed in the port or ports of origin.

The advantages accruing from such a fixed standard cannot be gainsaid : the one under discussion has worked well during the last seven years in Singapore. At present one is inclined to advocate some such standard in the case of "human" diseases, such as cholera and smallpox, but challenging its applicability to plague.

All ships arriving in Singapore from an "infected" or "suspected" port must fly the quarantine flag and anchor at the quarantine anchorage, where they are inspected by a port health officer.

Ships are divided into the usual three classes :—infected, suspected and healthy. An infected ship is one on which a case of plague, cholera, smallpox or yellow fever exists, or has existed at any time during the period of one month before arrival and on which no satisfactory measures have been taken subsequent to the occurrence of the last case by the accepted health authority of any port.

A suspected ship is either : (1) a ship coming from an infected port but which has had no case of the above-mentioned diseases on board during the voyage; (2) a healthy ship, or a ship coming from a clean port, but having on board passengers or cargo from an infected port, or contacts or suspects whose quarantine period has not yet been completed; (3) a ship on which the above-mentioned diseases have existed prior to the period of one month before arrival and which has not thereafter undergone satisfactory measures by the accepted health authority of any port; (4) at discretion a ship having on board 25 or more Chinese deck passengers coming from China, 25 or more Indian deck passengers coming from some Indian emigration depot as labourers, or 25 or more pilgrims; or a ship coming from a suspected port; or a ship on which a death has occurred during the current voyage; or a ship not carrying a surgeon which arrives from a port at which there is no accepted health authority.

A healthy ship is one which has had no cases of these diseases on board and which has not called at, or come from, an infected or suspected port, or a suspected ship that has received free pratique, or an infected ship which has received free pratique after satisfactory measures have been taken by the accepted health authority of any port.

In the case of an infected ship the following measures are taken :

(1) Patients are removed to the quarantine station.

(2) Cabin passengers are submitted to such disinfection and surveillance as the Port Health Officer may direct.

(3) If the disease has occurred among the crew the whole or part of the crew may be detained at a quarantine station.

(4) All passengers other than cabin passengers are disembarked at a quarantine station and there detained.

(5) Satisfactory measures of disinfection are then carried out.

The period of detention, observation or surveillance of suspects from the time of leaving an infected port, or from the time of effective isolation of the last case of infectious disease, is seven days for cholera and yellow fever, ten days for plague and fourteen days for smallpox.

The expression "satisfactory measures" referred to in the definitions of infected, suspected and healthy ships requires explanation. In the case of healthy ships leaving an infected port, these measures include :

(1) The prohibition of export of articles likely to convey infection;

(2) In the case of plague, thorough fumigation of the ship within twelve hours of departure, this fumigation to take place at a quarantine anchorage, after which the ship is prevented from re-entering the port;

(3) In the case of smallpox, vaccination of every individual, including all passengers and ship's officers who have not suffered from the disease or been successfully vaccinated within the previous five years.

(4) Disinfection immediately before departure of all clothes and effects of the native crew and deck passengers.

(5) Exclusion of all persons presenting any symptom of the disease in question.

In the case of passengers arriving by infected ships, satisfactory measures mean disembarkation of healthy cabin passengers for observation or surveillance on shore. Deck passengers are removed and isolated in quarantine stations; their clothes, effects and persons are disinfected, and in the case of smallpox, all deck passengers are vaccinated before being discharged.

After removal of the passengers, infected ships in the case of cholera are submitted to disinfection, *i.e.*, surface disinfection of all spaces used by the crew, deck passengers and actual patients, and of the upper main decks; and at discretion, the emptying and disinfection of water tanks, the disinfection of suspected cargo or stores, and the inoculation of the crew.

In the case of plague, in addition to the surface disinfection employed in dealing with cholera-infected ships, all holds and all spaces used by crew, deck passengers and patients are fumigated. At discretion the crew may be inoculated.

In the case of smallpox, surface disinfection as well as fumigation of all spaces used by crew, passengers and patients is carried out.

In the case of yellow fever the whole ship would be fumigated and all collections of water likely to contain mosquito eggs or larvæ removed.

It should be noted that, in the case of plague, vessels are fumigated in freight.

The above summary of the activities of the Port Health Department of Singapore is sufficiently complete to give an idea of what is being done by that department to protect Malaya from the introduction of infectious disease; to safeguard the health conditions of other ports visited by ships that pass through Singapore, and to secure the sanitary well-being of the crew and passengers of ships visiting the port. A careful inspection shows that the regulations are efficiently enforced with the minimum interference with shipping and commerce that is compatible with safety.

It will have been noted that a good deal is left to the discretion of the Port Health Authority, a discretion which is very necessary in view of the present varying degree of port health efficiency in the various ports with which Singapore is in direct communication.

It is only a relatively small percentage of vessels entering the port of Singapore that come alongside the wharves. The majority of ships lie out in the stream, and many discharge, or take in, their cargo into or from lighters which carry their cargo between the ship and storehouses many of which are situated on either side of the Singapore river.

The storehouses belonging to the Harbour Board situated along the wharves and docks are for the most part well constructed of material that prevents the burrowing of rats. With a minimum of trouble and supervision it should be possible to ensure that these godowns are kept relatively, if not absolutely, rat-free.

It is quite otherwise, however, with the stores and godowns situated on either side of the Singapore river. Most of these stores occupy the ground floors of buildings the upper stories of which are used as dwellings. These stores, filled with a miscellaneous assortment of goods, among which rice and paddy are most in evidence, afford abundant food and abundant shelter for rats.

The Singapore river is a tidal stream which, for a distance of a mile from its mouth, is at all times crowded with barges and lighters carrying cargo of many kinds to and from ships and riverside godowns. With conditions as they are, it would be difficult, if not impossible, to prevent the frequent interchange of ship and shore rats by means of this flotilla of barges. It has not been possible to obtain any information which would enable one to form any opinion as to the part played by these barges in the import or export of plague infection to or from Singapore, nor has it been possible to obtain information regarding the degree of rat infestation of these barges.

In view of the excessively high value of property in this part of Singapore and of other considerations, it would be idle at the present time to advocate the replacement of the ill-designed buildings on either bank of the Singapore river by rat-proof storehouses so constructed that they could be kept rat-free, though this is a public health consummation devoutly to be desired. In the meantime, when rat plague exists in Singapore, or when it threatens, the closest co-operation is necessary between the Port Health Authority and the Municipal Health Department, who are responsible for the health conditions of the buildings referred to.

Bills of Health.

"The Port Health Officer may issue Bills of Health in Form E in the schedule to these rules or special Pilgrim Bills of Health as prescribed by the 'Merchant Shipping Ordinance 1910', or at discretion may endorse any Bill of Health produced on behalf of the ship ".

A copy of the Bill of Health form in use at the ports of the Straits Settlements is reproduced on page 39 of this report. On the whole it is the best Bill of Health form in use in the East: it contains nearly all the information required, but nothing redundant, unless one take exception to the footnote containing the local conception of "epidemic" and "sporadic" states of ports which has already been referred to. The form, with certain modifications, appears to be suitable for general adoption in the Far Eastern ports.

The special Pilgrim Bill of Health used in Singapore is drawn up in accordance with the requirements of the International Sanitary Convention, Article 106 (Article 107, proposed revision).

No resource is had to anti-cholera vaccination in port health work. In dealing with cholera suspects and "contacts" on the Quarantine Island, this might prove in future to be a useful auxiliary measure. Its value has received abundant confirmation in recent years.

The housing of the coolie population employed in various duties in connection with shipping by the Harbour Board leaves much to be desired. Some of the more recently constructed coolie barracks are an improvement on the old, but there are very few that do not call for further improvement.

VIII — THE DUTCH EAST INDIES

The Dutch East Indies comprise practically all the innumerable islands of the Asiatic Archipelago that lie between 5° north latitude and 10° south latitude, extending from 95° to 141° longitude east of Greenwich. The greater part of this territory lies to the south of the Equator. Sumatra, Borneo, Java, New Guinea and the Celebes are the largest of these islands. The total combined area of the Dutch East Indies approximates 587,000 square miles. The total coast-line is stated to equal the circumference of the world. The population of this territory approximates 49,330,000, of which 35,000,000 live in Java, which is the seat of the central administration, and which, from the point of view of development, wealth, and prosperity, is by far the most important, though by no means the largest, island of the group. Java is the only island of the Dutch East Indies that was visited.

Java.

Java is an elongated island some seven hundred and fifty miles long from its western to ist eastern extremity, stretching from 105° to 115° east longitude, between 6° and 9° south latitude An almost unbroken line of volcanic mountains runs throughout the length of the island nearer to the southern than to the northern coast. Numerous mountains attain a height of between two and three thousand metres and some exceed this height; several of the volcanos in the eastern half of the island are active. An unbroken belt of swamp and marsh, of varying breadth, borders the northern coast-line; it is in this low-lying marshy land that the three most important ports of Java, Tandjong Priok (Batavia), Semarang and Surabaya, have been built. Throughout the greater part of the island the surface soil is laterite.

Climate.

The climate of the island is somewhat more diverse than in most tropical islands of the size, a diversity dependent upon variation in altitude, but in any given region the lack of variation characteristic of all tropical islands is the outstanding feature of the climate. Daily variations in temperature and humidity are almost negligible; rainfall may vary from day to day, but this is the only change of importance. There is nothing in any way comparable to the seasons of northern latitudes. Abundant rainfall; high temperature, high relative humidity, and feeble winds are the outstanding features of the climate along the low-lying coastal belt. A mean temperature throughout the year of between 26.5° C. and 28.5° C. with a relative humidity between 70 and 80 per cent characterise the climate of Batavia throughout the year.

In the hill stations a mean temperature of 21° C. is frequently experienced. At a height of 2,000 metres a mean temperature as low as 15° C. is registered. The hill tracts have likewise a very moist atmosphere, the relative humidity rarely, if ever, falling below 70 per cent.

The outstanding features of this climate are dependent upon the monsoons. The north-west monsoon, which prevails in what are the winter months in northern climes, is the chief rain-bearing current. The south-east monsoon, synchronous with the south-west monsoon of British India, is relatively dry in Java. The weather is perhaps most oppressive in the inter-monsoon periods.

Cultivation.

Perhaps the most noteworthy feature of Java is the abundant fertility of the soil and the extent of the cultivation, which often extends in terraces high up the mountain-sides. Undeveloped land in any quantity is hard to find, except in the south. Rice, sugar, maize, coffee, tea, tapioca, coconuts, rubber and cinchona plantations all thrive It is hard to conceive of a more fertile country.

Population.

The population, which approximates 35,000,000, is for much the greater part a rural one. There are few towns of large size, the four largest being Batavia (population 250,000), Surabaya (190,000), Semarang (160,000) and Bandoeng (95,000). The average density of population for the whole island approximates 700 persons to the square mile. In the thickly-populated districts in the centre and east of the island the density per square mile approaches 1,000; in certain *afdeelingen* it is as high as 1,700.

Administrative Divisions.

For administrative purposes Java is divided into seventeen divisions, or "residencies", each in the charge of a "resident". Four of these residencies are in West Java, seven in Mid Java, and six in East Java, one of the latter being the island of Madoera, which lies close to the north-east corner of the island. Each of these residencies is subdivided into *afdeelings*, there being eighty such *afdeelings* in all, the number in each residency varying between three and eight. The *afdeeling* consists of a number of districts which are further divided into subdistricts, each of which contains a number of *desas*, or groups of villages or *kampongs*.

Medical and Sanitary Administration.

The civil medical and sanitary administration of the Dutch East Indies is under the direction of an Inspector-General of the Civil Medical Service, with headquarters at Weltevreden (Batavia). The Inspector-General is directly responsible to the head of his Government, but financial questions have first to be referred to the Department of Education, Industry and Public Worship. Under the Inspector-General are four chief inspectors, one for West Java, one for East Java, one for Mid-Java, and one for Southern Sumatra. In the outlying possessions, military medical officers are entrusted with civil medical administrative duties, which they carry out under the supervision and direction of the Inspector-General of the Civil Medical Service. The special service that was brought into being to combat plague has hitherto been independent of the civil medical administration; it is probable that this special plague department will be absorbed by the Civil Medical Department in the near future.

The Government civil medical and sanitary service consists of 150 European doctors, for whom private practice is forbidden; one hundred of the 250 military medical officers undertake civil duties in addition to their own. There are 215 native doctors in Government employ, and 60 private doctors are subsidised as part-time Government officials.

Registration of Vital Statistics, etc.

The Civil Medical Department is responsible for the registration of vital statistics. It can be said at once that the figures denoting the number of deaths from all causes attain a very high degree of accuracy; but that the birth registration, though improving, is still everywhere very defective, even in the towns. With regard to the causes of death considerable uncertainty exists in Java as in most other countries. The figures denoting deaths from plague, cholera, and smallpox, however, are probably very close approximations. The symptoms of these three diseases are very familiar to the populations where these diseases prevail. The population is afraid of cholera and makes no effort to conceal it. It is possible, of course, that mild cases of cholera may go unrecorded, even in times of epidemic, but deaths from cholera in any number are unlikely to escape notice.

With regard to plague, the area of the country in which the disease prevails is circumscribed and continually under the observation of a special plague staff. When a death occurs in these areas the body is inspected as soon as possible by an "informer", an official sufficiently trained to make smears from spleen and lung punctures, and, if necessary, cultures. All such smears are examined, and if the diagnosis of plague be made, the other inmates of the house are segregated and the village is watched. In this manner it is unlikely that many deaths from plague go unrecognised. The fact, however, that bubonic plague in Java has a reported case mortality rate of 100 per cent indicates that the measures in force are inadequate for the detection of other than fatal cases. It is incredible that bubonic plague has in Java a much higher case mortality rate than has been observed in other Oriental countries.

The headman of each *desa* is responsible for reporting each week all deaths that may have occurred in his *desa*. These reports are at once transferred to the local medical official in charge, who is thus in a position to make immediate enquiry should the deaths reported be in excess of the normal. It is thus very improbable that any epidemic causing appreciably increased mortality could remain undetected for any considerable time in any part of Java.

Chief Causes of Sickness and Mortality.

A study of the curves representing weekly total mortality rates for Java as a whole during the last ten years reveals a somewhat surprising relative absence of any large seasonal variation in disease incidence. The only violent fluctuation in the mortality curve is that attributable to the influenza epidemic of 1918-19, which prevailed very severely in Java. With this exception, there is but little indication of any epidemic condition sufficiently grave to make a marked impression on the curve. Week after week, during the last ten years, with the exception of 1918-19, the total mortality rate has persisted in the neighbourhood of twenty per mille per annum, never below sixteen, very rarely above twenty-five, rates which can be considered very low for a tropical country such as this. When one comes to a comparative study of the curves for different districts, however, the relative healthiness of the central hilly districts as compared with the low-lying coastal tracts is at once apparent. Moreover, the mortality curves for the unhealthy coastal districts are not nearly so flat, most of them exhibiting rises in the second or third quarters of the year, attributable to malaria.

Malaria.

Of all causes of morbidity and mortality, malaria is by far the most important. Not only as a direct cause of death, but also as a predisposing cause of fatal infections of various kinds, does malaria contribute to the death-roll. The low-lying swampy areas along the north coast are the most malarious : here *Anopheles* (*Myzomyia*) *ludlowi* finds unlimited facilities for breeding and is the sole infective agent of any importance. "Fish-ponds", artificial ponds of salt or brackish water that have existed from time immemorial all along the north coast, connected with the sea and sometimes receiving fresh water from streams as well, are lucrative to their owners, but, by reason of the facilities for breeding that they afford to *A. ludlowi*, they are probably a factor of great importance in determining the high incidence of malaria. Certain areas in the interior of the country, notably among the foothills, are also very malarious. Here the fresh-water-breeding *A. aconitus* is responsible for carrying the disease. These two mosquitos are the only two malaria-carrying mosquitos of importance in Java. *A. maculatus*, which is the most important malaria-carrier in Malaya, occurs, but does not appear to play so noxious a role in Java as it does elsewhere.

Very valuable research work on the subject of the causation and prevention of malaria in Java has been, and is being, done by the Civil Medical Service.

In times of excessive prevalence of malaria, quinine, in large quantities, is made available to the population affected.

Respiratory Disease.

Pulmonary tuberculosis, pneumonia and other respiratory diseases are very widely prevalent, especially in the towns, where they contribute largely to the mortality.

Hookworm Disease.

Hook-worm infection is widespread; its importance as a factor determining ill-health is impossible to estimate on the data available.

Dysentery.

Both amœbic and bacillary dysentery are prevalent, and together contribute appreciably to the mortality rates.

Beri-Beri.

Beri-beri is commonly encountered but is apparently less prevalent than formerly. The decreased prevalence is attributed to the attention that has been devoted to the supervision of food supplies.

Yellow Fever, Typhus and Relapsing Fever.

Yellow fever, of course, has never been reported from the Dutch East Indies, though *Stegomyia fasciata* is abundantly present along the coast. The two louse-borne diseases, typhus fever and relapsing fever, are likewise conspicuous by their absence from Java.

The three diseases plague, cholera and smallpox, which are of chief importance from the point of view of the present inquiry, will now be considered in much greater detail.

Plague.

There are so many features of interest and importance that emerge from a study of the history of plague in the Dutch East Indies, of the results obtained by the anti-plague measures employed, and of other matters connected with the epidemiology of the disease as it has occurred in Java, that it is altogether impossible in a report of this nature to do more than call attention to such matters as appear to be of special interest or of practical importance. The writer desires, first of all, to express his indebtedness to the many informing reports and monographs published since 1911 by officers of the plague department and of the Civil Medical Department of the Dutch East Indies. These reports constitute a most valuable contribution to plague literature.

In spite of close and continuous maritime intercourse with plague-infected countries of Asia, the Dutch East Indies remained free from indigenous plague infection until the end of 1910. The first case of plague in Java in which the diagnosis was confirmed bacteriologically occurred in the district of Malang, which is situated among the hills due south of the important port of Surabaya. This was at the end of March 1911. A searching investigation was immediately carried out and it was ascertained that the disease was widespread throughout the Malang district, and that infection was also present in the three towns Surabaya, Madioen and Kediri. Dr. de Vogel, who was in charge of this enquiry, stated that there was evidence that plague infection was introduced into the port of Surabaya in the autumn of 1910, whence plague spread into the interior.

The source from which Surabaya obtained the infection is not definitely known. There is reason to believe that infection was introduced with rice. In this connection it is interesting to note that Dr. de Vogel reported that the import of rice from South China and from British India into East Java was steadily increasing in amount about that period, the increase being due to the fact that sugar cultivation was replacing rice cultivation over considerable areas. This rice import into Surabaya was greatest in amount during the autumn of 1910. Moreover, towards the end of January 1911, rat mortality was observed in a rice godown in Surabaya; three natives working in that godown fell ill and two of them died. During the next two months further cases were observed in Surabaya which also clinically resembled plague, a diagnosis which bacteriological examination failed to confirm.

Rice likewise appears to have been the vehicle by means of which plague infection was conveyed from Surabaya to the interior. It is reported that the station-master at Sidoardoja wrote a letter stating that dead rats had been found in some rice which was sent inland from Surabaya shortly before the outbreak of plague was reported. In the reports regarding the disease up-country, the occurrence of the earliest cases in the neighbourhood of rice stores or of railway godowns is emphasised.

In Surabaya human plague failed to assume epidemic proportions, but it was otherwise in the Malang district, situated at a considerable height above sea-level. Between April and August 1911, 1,500 cases occurred among a population of 740,000.

The subsequent history of plague in Java is epitomised in the following table, which gives the number of deaths attributable to plague which has been reported each year from 1911 to 1922 in the various residencies of West Java, Mid-Java and East Java respectively.

PLAGUE (DEATHS)

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
West Java												
1. Bantam	—	—	—	—	—	—	—	—	—	—	—	—
2. Batavia	—	—	—	—	—	—	—	—	—	13	5	—
3. Preanger-Regentschappen	—	—	—	—	—	—	—	—	—	—	—	—
4. Cheribon	—	—	—	—	—	—	—	—	—	—	—	—
Mid-Java.												
5. Pekalongan	—	—	—	—	—	—	—	—	—	—	64	190
6. Semarang	—	—	—	—	—	15	169	254	200	463	2,248	1,417
7. Banjoemas	—	—	—	—	—	—	—	—	—	—	—	—
8. Kedoe	—	—	—	—	—	—	1	241	2,583	8,194	3,987	4,533
9. Djojakarta	—	—	—	—	—	2	8	5	2	1	—	188
10. Soerakarta	—	—	1	4	1,405	575	41	12	—	12	3,112	4,477
11. Madioen	41	148	1,036	1,275	77	47	65	39	—	—	—	—
East Java.												
12. Rembang	—	—	—	—	—	—	—	—	—	—	1	1
13. Surabaya	32	49	337	1,010	331	214	99	182	165	218	97	64
14. Madoera	—	—	30	90	—	1	28	—	—	—	—	—
15. Kediri	125	573	2,984	4,090	1,803	244	8	—	4	—	57	52
16. Pasoeroean	1,957	1,464	6,964	9,236	2,635	8	1	—	—	17	103	21
17. Besoeki	—	—	—	—	—	—	—	—	—	—	53	—
	2,155	2,234	11,352	15,705	6,251	1,106	420	733	2,954	8,918	9,727	10,943

The most striking feature about the above table is the continued and almost absolute freedom from plague which West Java has enjoyed. The thirteen deaths reported in 1920 and the five in 1921 all occurred in the town of Batavia. Reference to these cases is made later.

The only district that has reported plague deaths in each one of the twelve years is Surabaya. There is reason to believe that infection among the rats of the town of Surabaya has been continuously present since 1910.

The third fact of interest that emerges relates to the transference of the most severely infected districts from East Java to Mid-Java. During the first five years the disease was practically confined to the districts of East Java and the easternmost district of Mid-Java. Since 1917, however, the Mid-Java districts have suffered much more severely, and, had it not been for the continued infection of Surabaya, East Java would have been practically plague-free. These facts indicate that the strenuous efforts made in the early years to eradicate the disease from the East Java districts were highly successful. Reference to these measures is made below.

The second phase of plague in Java characterised by the severity of the disease in Mid-Java appears to have been dependent upon the infection of the port of Semarang, in exactly similar manner as the first phase, or the epidemics of East Java, was dependent upon the infection of Surabaya. Semarang is the third most important port of Java. Semarang first reported rat and human plague towards the end of 1916. Whether the town was infected by sea or received its infection from East Java is not clear. The following year, 1917, the disease spread to the town of Ambarawa in the Semarang district, whence it spread to the hilly areas of Mid-Java in a manner very similar to the earlier spread of the disease in the eastern districts.

During 1922, the number of plague deaths reported was 10,943 : all these deaths with the exception of 138 occurred in the Mid-Java districts. The year 1922 has been the third most severe plague year in Java.

Plague in the Dutch East Indies outside Java has been very little in evidence. In 1918 plague mortality among the rats accompanied by human plague cases was reported from Belawan,

a port on the east coast of northern Sumatra. The disease originated in a godown filled with bags of rice which had come from Rangoon. Energetic measures were taken and Belawan is now reported free from plague. In 1920 rat plague wa also reported from Palembang, a port on the east coast of South Sumatra. No human cases occurred: this centre of infection was also eradicated. In December 1922 rat plague was discovered in Macassar for the first time. This important port in the Celebes is in close and constant communication with the port of Surabaya, where rat plague has persisted since 1911. The epizootic in Macassar appears to be widespread, although up to the present (December 31st 1922) only six human cases have been reported.

The geographical distribution of human plague cases in Java indicates that the disease can only prevail in severe form at high altitudes. The early epidemics in Eastern Java were most severe in villages situated between 1,500 and 4,000 feet above sea-level. The present severe outbreaks in Mid-Java have attained their greatest severity in towns and villages between 1,500 and 6,000 feet. In some of these high districts the disease has prevailed with great intensity. The most severe outbreak hitherto experienced is that of Temanggoeng. This district has a population of about 300,000; between July 1919 and June 1920 the plague mortality rate in Temanggoeng amounted to no less than 21 per mille. Quite otherwise is the behaviour of plague in the low-lying coast-lands. Here rat plague persists in the towns with great pertinacity, in spite of which fact human plague cases have never attained epidemic proportions. In such areas, as in Singapore and in Bangkok, it would appear that the incidence of human plague is a very inadequate index of rat plague. In the district of Semarang a plague epizootic among the rats which gave rise to no human cases was recently noted.

The seasonal prevalence of plague in Java has not been nearly so striking a phenomenon as it is in all severely infected plague areas of British India. This fact is hardly surprising. In the plague-infected towns along the coast, seasonal variations in temperature and humidity, factors which determine the seasonal prevalence of the disease in British India, are but little in evidence. In the hilly tracts, which have been the only severely infected areas in Java, seasonal variations in climatic conditions are likewise not marked and no constant well-defined seasonal prevalence of plague is apparent. On the whole it may be said that the earlier severe epidemics in the Malang area tended to reach their height in the last quarter of the year. The severe outbreak of 1919-20 in the Temanggoeng *afdeeling* reached its height in February. Below are given the number of plague deaths reported in each of the last six four-weekly periods of 1919 and of the first seven four-weekly periods of 1920 in the Temanggoeng *afdeeling*:

1919						1920						
8	9	10	11	12	13	1	2	3	4	5	6	7
32	43	81	406	642	936	1,229	1,359	1553	487	205	195	112

The total number of plague deaths reported each week, during the year 1921, from all the plague-infected districts of Java was as follows:

Week	Plague Deaths	[Week]	Plague Deaths	Week	Plague Deaths	Week	Plague Deaths
1	94	14	107	27	77	40	359
2	95	15	150	28	70	41	316
3	64	16	124	29	88	42	310
4	68	17	128	30	156	43	270
5	79	18	115	31	214	44	333
6	78	19	117	32	211	45	298
7	74	20	102	33	206	46	339
8	81	21	115	34	213	47	350
9	119	22	98	35	191	48	320
10	121	23	62	36	214	49	392
11	119	24	104	37	247	50	451
12	119	25	71	38	254	51	432
13	128	26	82	39	326	52	512

No further study of the influence of climatic conditions upon the seasonal prevalence, or, rather, absence of seasonal prevalence, of plague in Java is possible here.

Space does not permit of more than brief reference to the methods that have been found most effective in Java for combating plague. Many measures have been tried, found wanting, and rejected. It is not an exaggeration to state that at the present time "house improvement" and "plague prevention" are synonymous terms in Java.

In the hilly districts, which have been the scene of all the severe outbreaks of plague, the population for the most part lived in houses constructed of bamboos and bamboo matting, with thatched roofs. These dwellings were found to offer unlimited shelter for house rats, which make their nests in the bamboos, under the thatched roofs, between the layers of the matting walls, and even in the bamboos of which the bedsteads (*bale-bale*) are made. In the plague-infected villages such dwellings have been reconstructed in very large numbers. The thatched roof has been replaced by tiles; bamboo beams have been replaced by timber, and other constructional alterations have been made. The object of these improvements is to diminish the shelter available for rat nests and to render all parts of the dwelling readily open to inspection. (It should be noted that *Rattus rattus*, which in Java, as in British India, is the common house rat, rarely burrows as it does in most parts of British India.) When a house has been reconstructed on these lines it is almost impossible for rats to nest unobserved. These improved houses are regularly inspected by the plague department, who keep a special staff for the purpose. This staff in the Kedoe residency, which is at present the most severely plague-infected division of Java,

consists of eight "overseers", who have working under them 65 *mantris:* each *mantri* has four coolies. The duties of this staff include the inspection of all improved houses, searching for rats and rat nests, and sending such rats as may be found in an infected district to a laboratory for examination.

Only a small percentage of houses in plague-infected Java are constructed of sun-dried bricks or mud. In the case of such mud houses improvements are not quite so satisfactory, but in view of the non-burrowing propensities of the local rat, a considerable amount of success is attained here also.

The number of houses that have been "improved" in plague-infected Java amounts to some 750,000. In the Kedoe Residency above referred to, 32,234 houses were improved in 1919 and 1920, 40,593 in 1921 and approximately 20,000 in 1922, giving a total of nearly 93,000 houses—sufficient to house nearly half a million people.

The success that appears to have attended these measures is most encouraging. In this way the severely infected districts in East Java were cleared of plague and have remained plague-free for a considerable number of years. The only instance in which the method appears to have failed, relatively, is that of a portion of Ambarawa, where plague persists in spite of house improvement. Here the houses are unusually close together. The cost of such house improvement is considerable; the owner bears a proportion of this cost, if in a position to do so, paying his share by instalments.

The writer was privileged to see a good deal of this house improvement work and was very favourably impressed. It is effective, it is permanent, but it is slow and costly.

In addition to these house-improvement measures, regulations regarding the building of new houses are rigidly enforced.

Plague vaccination has yielded disappointing results in Java, where it has been given a fairly extended trial. In view of the noteworthy success that anti-plague vaccination has achieved in British India, the Java experience is surprising. No plague vaccination is now being done in Java.

As a rule the inmates of a house in which a death from plague has occurred are isolated for seven days.

When severe plague threatens a village, the inhabitants are provided with temporary shelter elsewhere.

Excepting the destruction of rats on ships and barges by means of fumigation in the chief ports, no active direct rat destruction measures are employed.

One striking difference between the behaviour of plague in British India and in Java respectively relates to the far greater incidence of "pneumonic plague" in Java than in British India. It is difficult to find a satisfactory explanation for this difference. Isolated outbreaks of pneumonic plague have occurred from time to time in British India, but they are, relatively, excessively rare. In Java, on the other hand, the great majority of districts that report deaths from bubonic plague report also a certain number of deaths ascribed to "primary pneumonic plague". Thus, of the 2,954 deaths from plague reported in 1919 no less than 57 were stated to be pneumonic, 1.9 %; 46 of these were from the Temanggoeng district; five other districts reported 4, 3, 2, 1, 1 deaths respectively. In 1920, of the 9,152 deaths from plague, 162 were described as primary pneumonic plague; these deaths were distributed among ten districts. In 1921, of the 9,763 plague deaths, no less than 620 or 6.3 % were described as primary pneumonic plague. During the year 1922 a few such cases are stated to have occurred among the contacts of fatal bubonic plague cases, during their period of observation. Such an event is remarkable. In practically no case are these people removed to quarantine before one or two days have elapsed since the death of the patient. A considerable proportion of these anomalous pneumonic plague cases have been single cases, indicating a much lower degree of infectivity than one is accustomed to associate with pneumonic plague.

There have been also typical outbreaks of pneumonic plague in Java, as to the nature of which there can be no question. Terminal plague pneumonias are by no means uncommon in cases of bubonic plague in British India, but primary pneumonic plague cases have been much less in evidence than they have been reported to be in Java (1).

In spite of the facts mentioned above, Java experience indicates that outbreaks of pneumonic plague are very easily controlled in the conditions there prevailing and occasion very little trouble or anxiety.

Plague experience in Java affords striking confirmation of the absolute dependence of human plague outbreaks upon rat epizootics.

Space does not permit of more than brief reference to the rats and fleas of Java. The literature on the subject is very considerable. *Rattus rattus* is the common house rat and has been responsible for most of the human plague. *Rattus concolor*, a small rat that is commonly found in Burma and other parts of the Indo-China peninsula, is also frequent in Java as a facultative house rat. In the chief ports *decumanus* is also found : its presence has also been reported in two or three towns situated on rivers in the interior. How it got to these situations is not clear; the towns in question are situated very many miles above the navigable portions of the rivers.

Speaking generally, the flea infestation of rats appears to be very much lower than in severely plague-infected parts of British India, though in plague-infected regions in the highlands of Java the number of rat-fleas occasionally found in the rat nests has been very high.

The plague history of the Dutch East Indies affords further examples of the extreme difficulty with which plague infection is carried over long distances and from country to country.

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(1) A proportion of these cases of pneumonic plague are diagnosed post mortem by the finding of plague-like organisms in smears made by lung puncture and their absence in spleen-puncture smears. Such diagnoses are obviously worth little or no consideration.

The first infection of Surabaya in 1911, of Semerang in 1916, of Batavia (Tandjong Priok) in 1920, of Macassar in 1922 are cases in point, and recall the long-delayed infection of Rangoon and Colombo. All the towns mentioned are important ports in constant shipping communication with ports of Asia that have been plague-infected for nearly thirty years. That the long-continued immunity of such places can be ascribed to measures taken to impede the spread of the disease appears to be very unlikely to those conversant with local conditions and with such local measures.

Plague experience in Java likewise lends support to the views long held by the writer regarding the mechanism of the transfer of plague infection from place to place. All who have studied this question in Java have come to the conclusion that the human case is of no importance in the transmission of plague infection. Moreover, experience in Java has shown that human beings do not carry rat-fleas on their persons or clothing for any distance, and that this theoretically possible method of conveying plague infection from place to place is completely negligible from a practical point of view.

Java experience has also afforded many striking examples of the facilities afforded by the movements of grain, for the transference of rats and rat fleas over considerable distances, and of the risk of transmitting plague infection occasioned thereby. Over short distances, bundles containing material attractive for rats appear to have been the most common medium for the transmission of infection.

Cholera.

The number of cases and deaths ascribed to cholera that have been reported in each of the seventeen residencies of Java during each of the eleven years from 1912 to 1922 is detailed in the following table :

	1912		1913		1914		1915		1916	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
West Java.										
1. Bantam	—	—	263	177	305	232	—	—	30	22
2. Batavia	547	445	781	651	211	153	414	330	345	223
3. Preanger-Regentschappen	22	15	121	62	65	51	73	51	191	106
4. Cheribon	—	—	427	320	—	—	199	86	846	530
Mid-Java.										
5. Pekalongan	76	41	195	142	—	—	139	79	92	81
6. Semarang	664	340	138	102	5	5	8	3	12	11
7. Banjoemas	—	—	2	2	—	—	—	—	—	—
8. Kedoe	57	39	13	7	—	—	—	—	1	1
9. Djokjakarta	5	1	—	—	—	—	—	—	—	—
10. Soerakarta	1	1	—	—	2	0	—	—	—	—
11. Madioen	662	399	412	225	—	—	—	—	53	47
East Java.										
12. Rembang	636	519	30	15	87	68	19	8	—	—
13. Surabaya	2,186	1,842	17	13	799	587	420	335	41	24
14. Madoera	297	198	1	1	55	41	103	75	—	—
15. Kediri	714	522	371	266	1	1	10	7	67	44
16. Pasoeroean	1,309	1,142	70	55	7	6	175	132	26	19
17. Besoeki	8	7	3	2	—	—	16	12	—	—
TOTALS	7,184	5,511	2,844	2,040	1,537	1,144	1,576	1,118	1,704	1,108

	1917		1918		1919		1920		1921		1922	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
West Java.												
1. Bantam	5	5	92	68	4	2	4	1	—	—	—	—
2. Batavia	354	178	1,623	885	73	13	37	9	—	—	—	—
3. Preanger-Regentschappen	35	22	592	308	14	12	7	4	—	—	—	—
4. Cheribon	38	24	1,580	1,017	105	75	—	—	1	0	50	26
Mid-Java.												
5. Pekalongan	—	—	1,446	1,151	11	10	—	—	—	—	1	1
6. Semarang	1	1	2,963	2,473	1,070	903	1	0	—	—	—	—
7. Banjoemas	1	1	181	123	1,035	655	—	—	—	—	1	1
8. Kedoe	122	92	—	—	1,243	950	2	0	—	—	—	—
9. Djokjakarta	—	—	3,400	1,351	950	513	—	—	—	—	—	—
10. Soerakarta	—	—	367	140	1,271	897	—	—	—	—	—	—
11. Madioen	—	—	6	5	1,143	979	—	—	—	—	—	—
East Java.												
12. Rembang	—	—	—	—	836	553	—	—	1	0	—	—
13. Surabaya	8	4	957	820	962	735	2	2	—	—	—	—
14. Madoera	—		1,122	868	305	188	—	—	—	—	—	—
15. Kediri	—	—	226	141	2,922	2,211	1	1	1	1	—	—
16. Pasoeroean	—	—	69	43	193	132	—	—	—	—	—	—
17. Besoeki	—	—	598	471	47	33	—	—	—	—	—	—
TOTALS	564	327	15,222	9,864	12,184	8,861	54	17	3	1	52	28

During these eleven years cholera has been responsible for a very considerable mortality. The most interesting fact, however, which emerges from a study of the table relates to the almost complete immunity to cholera which Java has enjoyed during the years 1920 to 1922. The 50 cases and 26 deaths ascribed to cholera in 1922 in the Cheribon Residency were all doubtful cases. The outbreak resembled cholera clinically, but repeated bacteriological examination failed to demonstrate the presence of the cholera vibrio. It is scarcely an exaggeration to state that during the last three and a half years the whole of the Dutch East Indies has been free from cholera; the very considerable outbreak experienced in 1919 was confined almost entirely to the first six months of that year.

The disappearance of the disease from such a large territory is most noteworthy. Local medical opinion inclines to the view that anti-cholera vaccination practised on a very extended scale was chiefly responsible for this astonishing success. The amount of cholera vaccine distributed by the Pasteur Institute of the Dutch East Indies to various parts of the Archipelago, chiefly to Java, was, in 1918, 5,423,232 c.c. and in 1919, 3,859,144 c.c. During these two years, whenever cholera cases were reported, intensive vaccination of all the population in the vicinity was undertaken as rapidly as possible.

It is not desired for one moment to oppose the view that vaccination on this extensive scale has been a factor of great importance in determining the low incidence of the disease during recent years, but it is more than probable that other unknown factors have also been at work prejudicial to the epidemic evolution of cholera. Thus, in the published health report for the year 1919, we read that depots of cholera vaccine were established in several towns in the outlying colonies, but that no great use was made of them owing to the fact that in the second half of 1919, when the depots were ready, cholera did not assume epidemic proportions anywhere in the Archipelago. Moreover, it is significant that during the last two years Singapore has also been completely free from cholera. Though caution is necessary in any attempt to estimate the benefits conferred on Java by extensive cholera inoculation, there can be no doubt that such benefits have been very appreciable and similar action is well worth extended trial in other cholera-infected areas of the Far East. It should be noted that during recent years a mixed cholera and typhoid vaccine has been used in Java and that as a general rule only one inoculation is given; repeated inoculations are almost impracticable among a civil Oriental population. It is gratifying to learn that the population have learnt to appreciate the protection conferred by cholera inoculation and very readily avail themselves of it.

Smallpox.

Smallpox was formerly one of the most dreaded epidemic diseases of the Dutch East Indies. Thanks, however, to a well-organised vaccine service, the disease has shown a markedly decreased incidence in recent years, a fact which is evidenced in the following table, which sets forth the cases and deaths reported each year in the various residencies of Java from 1912 to 1922 (1).

	1912		1913		1914		1915		1916		1917	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
West Java.												
1. Bantam	—	—	108	85	82	17	85	25	182	39	78	10
2. Batavia	2,055	159	757	146	2,446	470	1,414	346	1,066	188	964	186
3. Preanger-Regentschappen	138	2	—	—	1,060	175	276	51	358	40	177	31
4. Cheribon	—	—	5	0	391	73	1,067	241	177	15	108	3
Mid-Java.												
5. Pekalongan	—	—	828	241	4,385	976	305	52	19	0	28	2
6. Semarang	756	375	5,420	937	384	55	103	17	151	8	40	0
7. Banjoemas	—	—	2,003	440	1,944	236	371	45	223	25	254	6
8. Kedoe	60	4	592	53	729	97	616	118	415	62	169	16
9. Djokjakarta	304	27	166	25	1,093	182	661	112	75	2	5	0
10. Madioen	644	260	2,311	368	230	26	6	1	4	0	49	2
11. Soerakarta	—	—	5,483	706	409	63	5	1	11	3	—	—
East Java.												
12. Rembang	2,446	426	3,751	787	885	125	166	1	165	8	118	1
13. Surabaya	3,754	1,199	814	175	153	18	29	7	53	2	12	1
14. Madoera	1,625	338	903	169	218	31	35	16	3	1	2	0
15. Kediri	855	257	1,162	379	129	29	16	3	19	2	21	3
16. Pasoeroean	2,051	563	5,263	1,840	850	273	34	1	15	2	9	1
17. Besoeki	3,939	906	7,623	1,771	220	22	128	2	154	1	150	1
TOTALS	18,627	4,524	45,189	8,397	16,060	2,967	5,317	1,039	3,090	398	2,177	263

(1) The excessively low case mortality rate in certain of the outbreaks noted above almost makes one doubt the diagnosis : if the majority of the cases be indeed smallpox this disease exists in Java in a very mild form. The decreased incidence in recent years, especially in East Java, is very noteworthy.

	1918		1919		1920		1921		1922	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
West Java.										
1. Bantam	166	38	122	25	121	19	128	41	122	10
2. Batavia	2,103	801	718	208	421	77	572	129	203	20
3. Preanger-Regentschappen	245	49	2,813	650	464	99	44	9	23	4
4. Cheribon	147	3	454	47	127	15	50	0	50	4
Mid-Java.										
5. Pekalongan	34	6	1	1	74	24	114	10	137	21
6. Semarang	3	0	1	0	1	0	40	16	351	208
7. Banjoemas	240	2	108	14	863	160	239	46	72	0
8. Kedoe	152	0	41	4	301	67	232	19	59	1
9. Djokjakarta	27	0	—	—	4	1	—	—	24	5
10. Madioen	134	1	2	0	2	2	—	—	31	1
11. Soerakarta	2	0	38	3	3	0	—	—	24	5
East Java.										
12. Rembang	43	0	22	0	8	0	—	—	2	0
13. Surabaya	45	8	16	1	6	2	7	1	1	0
14. Madoera	—	—	5	0	—	—	3	0	—	—
15. Kediri	28	0	5	1	1	0	3	0	6	0
16. Pasoeroean	26	0	24	0	1	1	2	0	1	0
17. Besoeki	95	1	13	1	3	0	11	0	4	1
Totals	3,490	909	4,383	955	2,400	467	1,445	274	1,086	275

In the outlying islands of the Dutch East Indies, smallpox outbreaks still occur from time to time, but here, too, vaccination has markedly decreased their number and severity.

The vaccine-lymph employed throughout the Dutch East Indies is animal-lymph made at the Weltevreden Pasteur Institute and gives excellent results.

The vaccination staff consists of about 300 men in Java, and 200 in the outlying islands. All the energies of this staff are devoted to smallpox vaccination. They are trained at the Central Institute in Weltevreden, their course of instruction lasting four months. Each vaccinator is allotted a limited district, through which he tours constantly, the result being that practically all infants are vaccinated during the first six months of life, and that a large majority of the population is re-vaccinated every five or seven years.

In view of the careful attention now being paid to smallpox vaccination in the Dutch East Indies, one can safely predict that before long smallpox will be a rare disease in the colony.

The records of the vaccination staff are being utilised as a check for the birth registration statistics.

Ports of the Dutch East Indies.

The many thousands of miles of coastline in the Dutch East Indies are rich in harbours of greater or less importance, but there are not more than six in which the volume of trade justifies their inclusion in a list of important ports. In appraising their relative importance, the combined value of imports and exports for 1913, the last pre-war year, may conveniently be taken as an index. The war caused dislocation of trade here as in all other parts of the world. On this basis the six most important ports are as follows :

Port (1)	Value in guilders of combined exports and imports for 1913
Java.	
Surabaya	209,000,000
Tandjong Priok (Batavia)	137,309,000
Semarang	129,000,000
Sumatra.	
Belewan-Deli (Medan)	108,187,000
Celebes.	
Macassar	34,617,000
Sumatra.	
Emmahaven (Padang)	23,445,000

The average annual value of the imports into all the ports of the Dutch East Indies for 1916, 1917 and 1918 amounted to 468,000,000 guilders, and of exports from such ports to 772,000,000 guilders.

It will be noted that from the trade point of view the Javanese ports much exceed the others in importance. The three Java ports were the only ones visited during the tour.

(1) Of the above-mentioned ports, Surabaya, Tandjong Priok, Belewan-Deli, Macassar and Padang have quarantine stations and facilities for fumigating large vessels; in the case of the two latter, the quarantine stations are not well installed and equipped In addition there are facilities for the fumigation of large vessels at Sabang (Sumatra) and in the island of Samboe, just south of Singapore: Semarang has a small isolation camp and an infectious diseases hospital.

These three Java ports have certain features in common. All are situated on the low-lying marshy land which borders the coast all along the northern shore of Java. All were originally constructed at the mouths of rivers, which rivers formerly formed the ports. In each case the rapid silting up of the rivers entailed the construction of breakwaters on either side of the river at right angles to the coast, thus lengthening the river, as it were, seawards, and keeping the channel between the breakwaters dredged. Thus arose the "harbour canals" characteristic of each port. In each case such measures proved inadequate to the rapid trade development of recent years, which led to the construction of the modern harbours of Surabaya, Tandjong Priok and Semarang respectively. All three ports are malarious, all possessing unlimited breeding grounds for *A. ludlowi* in their immediate vicinity. The climate of all three ports is similarly hot and damp. In the case of all three ports the marsh that has to be reclaimed to permit of harbour or town extension has been a formidable obstacle to such extension. Such are the features in common. The modern ports into which the three ports have developed are very dissimilar, however. Surabaya and Tandjong Priok have been so constructed as to permit large vessels to be berthed alongside the wharves. Not so with Semarang, where all but the very smallest sea-going vessels have still to anchor some four miles out at sea. The port of Surabaya remains a part of the town, having been built close to the site of the old port, whereas Tandjong Priok has been constructed in the middle of the Bay of Batavia, some nine kilometres east of the mouth of the Tjiliwoeng or Batavia River, which formed the original port of Batavia.

Surabaya.

The town and port of Surabaya are situated at the mouth of the river Kali Mas, on either bank of which the town stretches from north to south. The coastline at this point faces almost due north and is separated from the eastern end of the south coast of the island of Madura by a distance of little more than three miles. The narrow strait thus formed affords excellent anchorage for ships, being protected from the north by the island of Madura and from the south and west by the Java coast. The east end opens on the strait of Madura. All the port area and a great portion of the town are built on what was originally swamp, and one can but admire the temerity of men who started to build a town in such unpromising surroundings. From the health point of view these swamps were made even worse than they might have been by the construction of fish ponds—artificial ponds of salt or brackish water, communicating with the sea—which existed long before the island was under European domination and which are to be found in very large numbers all along the north coast of Java. All these fish ponds afford facilicies for *Anopheles ludlowi* to breed, and their propinquity to many of the coastal towns is responsible for the very high malaria rates therein prevailing. Some of the fish ponds which existed close to the western boundary of the port area of Surabaya have comparatively recently been filled in, with an already appreciable diminution of malaria incidence.

The population of Surabaya approximates 190,000, of whom 142,000 are natives of Java. The houses in which the native population live are varied in type. From the health point of view the best and most modern are good; the worst are indescribably bad. It will be readily understood that the difficulties of town-planning, which are great in all Oriental cities, are increased a hundredfold in the case of a town that has been erected in the middle of a swamp.

In the older parts of the town the main streets are narrow and crowded with traffic at most hours of the day. The shops and houses on either side of these streets are for the most part two-storied buildings.

The death-rate from all causes during the last ten years has been more often nearer 60 than 50 per mille. During the last quarter of 1922 the death-rate showed some diminution. For the 10th, 11th and 12th four-weekly periods of 1922, the death-rates were 53.8, 41.4 and 39.4 per mille per annum respectively.

As a cause of mortality and sickness, malaria is far and away the most important; next in order of importance comes pulmonary tuberculosis and other respiratory diseases. Intestinal diseases including dysentery are of frequent occurrence and typhoid fever is not uncommon.

The number of deaths and causes of death are very accurately recorded. Post-mortem examinations are obligatory in the three port towns of Java.

The notification of infectious disease is obligatory.

As has been stated elsewhere, Surabaya was the port through which plague infection was first introduced into Java at the end of 1910. It is probable, nay, almost certain, that the disease has been endemic among the rat population of Surabaya ever since, though it has never been a serious cause of human sickness and mortality. In other words, Surabaya appears to afford another instance of the incidence of human plague failing to be an adequate index of rat plague. It is very exceptional for a month to go by without one case at least of plague occurring, though once, during 1922, an interval as long as 59 days occurred between the reporting of two consecutive cases. Plague in Surabaya has exhibited no well-marked seasonal prevalence, though February has been the month of maximum incidence. Below is given in tabular form the incidence of plague deaths during three recent years.

Month	1919	1920	1921
January	66	26	1
February	35	40	4
March	17	33	2
April	8	20	6
May	1	3	1
June	2	6	3
July	1	3	1
August	9	6	7
September	6	4	18
October	9	7	10
November	3	7	10
December	10	1	11
	167	156	74

The total deaths ascribed to plague in the town of Surabaya in the remaining plague years were as follows :

1911	23	1915	193
1912	46	1916	199
1913	352	1917	95
1914	470	1918	145

A study of the place distribution of these cases during recent years indicates widely-distributed rat plague, though on the whole there has been a tendency for cases to occur most frequently in proximity to the river banks.

No real anti-plague measures are at present undertaken in the town of Surabaya. There is such abundant evidence that plague as a human disease cannot thrive at sea-level in these latitudes that the health authorities are inclined to pay little heed to the occurrence of an occasional case. An effective rat campaign would certainly be difficult to prosecute in conditions such as those prevailing in Surabaya; nothing of the kind is at present attempted, and consequently no recent observations have been made regarding the degree of rat infestation of the town or the flea infestation of the rats. From observations published in the early years of plague in Java, we know, however, that *Rattus rattus* and *Decumanus* both occur in Surabaya. The measures that are being taken to prevent Surabaya acting as a source of plague infection to shipping and to other ports will be discussed in a later paragraph.

Smallpox.

Smallpox has been very little in evidence in Surabaya in recent years—more than half the total population of the town has been vaccinated recently. In 1919 sixteen cases and two deaths were registered; in 1920 four cases with two deaths, and in 1921 one case that recovered. No case was reported in 1922.

Cholera.

No case of cholera occurred in either 1920, 1921 or 1922, but an outbreak of some severity occurred in the first six months of 1919. Two hundred and eighteen cases were reported, of whom 81 died. A vigorous cholera-vaccination campaign was undertaken, when no less than 63,000 persons were inoculated in 22 days. The population submit themselves very readily to cholera inoculation.

Cerebro-spinal meningitis caused two deaths in 1920; no case was reported in 1921.

The Port of Surabaya.

Surabaya is the chief export and import port of East Java, perhaps the richest part of the island. Added to this the sheltered anchorage to which reference has been made has resulted in Surabaya becoming the most important port in the Dutch East Indies, though, with regard to passenger traffic, Tandjong Priok takes first place. The new excellent harbour basin, quadrilateral in shape, has been constructed immediately to the west of the mouth of the Kali Mas which formed the old port. Excellent quays, alongside some of which there is a water depth of as much as 16 metres, have been made. Further piers and quays are in course of construction. The entrance to the enclosed artificial harbour is 350 metres wide. A new canal, the Kali Perak, has been constructed immediately to the west of the harbour basin. Railway sidings, floating docks, well-built storehouses and godowns, good wide roads, administration offices, and all the other appurtenances of a modern busy harbour are well designed and arranged. Further land is being reclaimed from the swamp on the west of the harbour : this will not only allow of further extensions but will undoubtedly be most beneficial to the health of the resident community.

The Kali Mas River has recently been widened. This river has large godowns on either bank for two or three miles from its mouth. The fleet of lighters or *praus* that throng the river, and the enormous quantities of produce that fill the storehouses, afford testimony to the great importance of this portion of the harbour's activity.

A European port health officer with an Indian assistant medical officer are in charge of the sanitary administration of the port. Two Clayton apparatus on lighters for the fumigation of ships are in frequent use. The excellent Government bacteriological laboratory is available in case of need, as is also adequate hospital accommodation for infectious and other diseases. There is a quarantine station on the south coast of the island of Madura across the strait and clearly visible from the harbour. This quarantine station is not often in use and is not very satisfactory: the water supply is insufficient.

There is a good and safe water supply for the town and port of Surabaya. A part of this supply comes from the hills, a part from the river just above the town. This latter supply is first filtered through mechanical filters after treatment with alum, and subsequently purified by an ozone process. The ozone plant was not working when the waterworks were visited, and the water was being chlorinated after filtration. The results of this treatment appear to be eminently satisfactory.

Great attention has been paid at Surabaya to the destruction of rats on *praus* and lighters. The process adopted is the burning of sulphur, in pots, in the empty vessels covered with a tarpaulin. The amount of sulphur used is 50 grammes for each cubic metre of space. Every lighter or similar vessel plying in the harbour or on the rivers and canals of Surabaya is thus treated periodically. During December 1922, 867 small vessels of this description had been so treated and the number of rats killed by this fumigation was 107.

Some interesting observations have been made in the Java ports regarding the rat infestation of the small craft that play so important a role in the activities of all Oriental ports, and the effects of sulphur fumigation of such craft. During the first three months of 1922 certain boats were fumigated each month, others at intervals of one and a half months, two, three, four, five, and six months respectively; with the following results, which are typical of all :

	1 month	1 1/2 mos.	2 mos.	3 mos.	4 mos.	5 mos.	6 mos.
Number of boats fumigated. . . .	155	99	114	53	41	22	36
Number of rats killed in such boats .	3	5	12	10	14	10	21
Average number of rats per boat .	0.01	0.05	0.10	0.19	0.34	0.45	0.6

There are two fumigating stations in Surabaya where these lighters and other small craft are treated. During 1922 a similar process was carried out in 37 coastal towns or villages in East Java. This is no longer considered necessary; in future, boats will be fumigated only at Surabaya; at Grisee, some $11^1/_2$ kilometres north-west of Surabaya; and at Bedanten, at the mouth of the Solo River. Practically all the small craft plying along this coast touch at one or other of these ports.

All cargo of such a nature as to render it liable to harbour rats is fumigated with sulphur dioxide, either before being put on an outward-bound vessel, or the ship itself is fumigated in freight.

Batavia and Tandjonc Priok.

On the northern coast of West Java the Bay of Batavia, thirty-nine kilometres across its widest part, and thirteen kilometres in depth, is a well-marked physical feature. The bay is dotted with numerous coral islands : into the western end of this bay the Tjilwoeng or Batavia River empties its water. In the swamp around the mouth of this river the earliest Dutch settlers founded their capital, and here until recent times was the port of Batavia situated. This river-mouth port was never navigable for ships of any size, and the constant silting up gave, and gives, rise to endless trouble (for the river, or harbour-canal into which the river was converted, is still alive with fishing vessels and small coasting craft carrying miscellaneous cargo). Large vessels remained anchored in the island-studded bay and their needs were attended to by lighters. Such an arrangement failed altogether to satisfy the needs of a rapidly-growing trade, and Tandjong Priok, the modern harbour of Batavia, was built. Unfortunately no suitable site for this port could be found nearer than nine kilometres to the east of the town. The modern port and town are now linked up by that distance of railway, road and canal, all of which traverse the swampy country parallel with and at no great distance from the shore.

The modern port consists of an outer harbour and an inner harbour, the latter consisting of two completed harbour basins and one other approaching completion. The quays along both sides of these harbour basins are furnished with excellent godowns, and are linked up with the railway system of Java. A fine railway station is in process of construction. To the west of the harbour is a railway yard, offices, and a floating dry dock. Here also are a market and old coolie lines.

To the east of the harbour are situated new coolie lines and, still further east, a fishing harbour. The canal joining the port and the old town of Batavia flows into the west side of the outer harbour, where there is a *prau-haven*.

All the buildings constituting this well-equipped port are built on land that has been reclaimed from the swamp which encircles the port on its three landward sides. Further reclamation is being actively pursued.

The port health work is in charge of a European medical officer who resides in the port. He has a small dispensary. There is also a hospital and dispensary belonging to the K. P. M. or Royal Packet Navigation Company. Cases of infectious and other diseases can also be transferred to the Batavia town hospitals. The services of the Central Government Laboratory at Weltevreden are at the disposal of the port in case of need. The new coolie lines on the east side

f the harbour have their own small hospital. There are two Clayton fumigation apparatus, ach on a lighter.

Tandjong Priok and Batavia at the present time are free from both cholera and plague. mallpox occurs in the town from time to time, but the condition of the population as regards mallpox vaccination is described as satisfactory. There were 203 cases and 20 deaths from mallpox in Batavia in 1922—a low case mortality rate.

Rat plague and human cases were reported from both Tandjong Priok and Batavia towards he end of 1920. Dead rats in considerable numbers were found in many godowns in all parts f Tandjong Priok in July 1920. The rats in Batavia and Meester Cornelis were also infected. n spite of this widespread rat infection, the total human-plague deaths in the residency of Batavia vere 13 in 1920, and five in 1921! No human cases of plague have been notified during 1922 rom either place nor has rat plague been observed.

The chief causes of sickness and mortality and the total death-rate from all causes in Batavia re so similar to those of Surabaya that further detailed discussion is hardly necessary. The wellings in the worst parts of both towns, built in unreclaimed swamp, leave everything to be lesired.

Batavia has now a very good water supply from the hills; the old supply from artesian wells, vhich the new supply has only recently replaced, was far from satisfactory.

The Quarantine Station of Batavia. — Pilgrim Traffic.

In the west end of the Bay of Batavia, a six-mile sail from the old port of Batavia to the iorth-west, and about two miles from the nearest part of the Java coast, is a group of three small oral islands. Two of these islands, Onrust and Kuiper, form the chief quarantine station of the)utch East Indies, and the third island is used as a cemetery for the burial of those who die in he quarantine station. The smallest of these islands is Kuiper; it is the "dirty" half of the qua- antine station. Here the people undergoing quarantine are cleansed, and their clothing and ffects are disinfected. The island is provided with a good landing-stage, and vessels of consi- lerable draught can come close to the island. Kuiper is also provided with a hospital for infectious lisease, which is not a satisfactory building; it is unsuited to the climate. It is proposed to eplace it by a simpler and more usefully designed hospital. Kuiper is also provided with a most laborate series of chambers, designed for the disinfection of clothing and effects by means of ormaline and steam, the so-called Japanese method, so unnecessarily elaborate that it cannot ften have been employed. At present disinfection is carried out, by the same method, in two ailway trucks that have been suitably adapted. These are simple and sufficient. Kuiper ias its own artesian-well water supply; the bathing accommodation is good. There is office ccommodation for the doctor, whose duty it is to submit all new-comers to medical exam- nation.

A small causeway and a ferry connect the island of Kuiper with the isle of Onrust, which ies some 500 yards away to the north. The latter island is considerably larger and is in every vay admirably adapted and equipped for the purpose it serves, namely, the "clean half" of the [uarantine station. Thirty-five barracks, each designed to accommodate 100 persons, are satis- actory. There is a good water supply. The island is free from mosquitos except for an occa- ional specimen that may be blown over from the mainland. There is a hospital; residences and ffices for the resident superintendent and for the doctor who takes up his residence in Onrust vhen the station is in use; suitable quarters for the subordinate staff; satisfactory kitchens; n fact all the appurtenances necessary for the efficient working of the station. In addition, the sland is well wooded and picturesque—a by no means disagreeable spot for an enforced ioliday.

The main purpose to which this quarantine station is put at present is to provide accom- nodation for pilgrims returning from the Mecca Pilgrimage. These number at present between 20,000 and 30,000 a year. All returning pilgrims are taken to some quarantine station. If here be no serious disease of an infectious nature among them, they are only detained sufficiently ong as to permit of the thorough cleansing of the ship. If there be serious infectious disease among them, they are kept in quarantine for an appropriate period before being permitted to proceed to their ultimate destinations in the Archipelago.

Here it might be stated that all pilgrims starting for Mecca from the Dutch East Indies re submitted to smallpox vaccination and also to inoculation with a typhoid-cholera vaccine. Since these measures have been in force the incidence of these diseases among the pilgrims from he Dutch East Indies is said to have very markedly diminished. Cholera has been conspicu- ously absent. At the last port of call in the Dutch East Indies for outward-bound pilgrims ships, usually Sabang, the extreme northern port of Sumatra, such ships are submitted to final inspection o ascertain that they comply in all respects with the conditions laid down for such vessels in the nternational Sanitary Convention.

Semarang.

From a public health point of view, Semarang is not entitled to be considered as a first- class port. Large vessels cannot enter the port but anchor some four miles from the port in an anchorage that is not well protected. In the rough weather that is sometimes experienced during he north-western monsoon, communication with the shore may be difficult, if not impossible. All such communication is made by means of launches and lighters. There are no facilities in

Semarang for the fumigation of large vessels and there is no quarantine station connected with the port, nor is one required. All the same the figures given on a former page indicate the importance of the trade that is carried on in the port. It is, in fact, the chief export and import port of the rich and fertile districts of Mid-Java. The enormous storehouses and godowns, crammed to overflowing with sugar and other produce, awaiting export, is eloquent testimony to the value of the trade of Semarang. The total amount of goods exported and imported in 1918 was 907,000 tons.

The harbour of Semarang is a *prau-haven* and nothing more, but a *prau-haven* of very great importance. As in the case of Soerabaya and Batavia, a river mouth formed the original harbour. Constant silting made this insufficient and a new harbour canal was built. This too soon failed to meet the needs and a new *prau-haven* was constructed on the east side of the mouth of the harbour-canal and connected with it. This is admirably constructed; piers, on which are well-constructed storehouses, connected with the railway system, have done much to provide the greatly-needed additional accommodation. There is also a good fishing harbour. Large storehouses line both sides of the harbour canal.

A port health officer is in charge of the sanitary administration of the port. All lighters and small craft employed in the harbour are fumigated every three months in the manner which was described in the case of Soerabaya. The average number fumigated each day is between six and seven. All cargo likely to attract or harbour rats is fumigated in the lighters before these are towed out to the steamers in the anchorage. For this purpose a small Clayton apparatus would give more certain results than the method of burning sulphur in pots (50 grammes per cubic metre) which is now employed.

Government hospitals and a laboratory in the town are available for the use of the port in case of need. The water supply is from the hills and is of good quality and sufficient. The water boats of the port are quite satisfactory.

The town of Semarang, from the point of view of climate, disease prevalence and mortality incidence, is so similar to Batavia and Surabaya that no separate description is called for here. As already stated, Semarang became plague infected at the end of 1916 and it is almost certain that rat plague has persisted in the port ever since. Human cases still occur from time to time, but never in anything like epidemic form, never sufficiently seriously to necessitate any anti-plague measures, which is in a measure unfortunate. The smallpox incidence is not high, and cholera is at present conspicuous by its absence. The low-lying portions of the town are extremely malarious.

In one respect Semarang is much more fortunate than the two other towns that have been considered. The hills of the central Java system approach much nearer the north coast at Semarang than at any other point. The result is that recent town extensions have been possible at a considerable height above the sea. The modern residential part of Semarang, beautifully laid out with excellent roads, is most attractive in appearance and affords welcome relief from the oppressive heat of the town below.

Semarang is a rapidly growing town and the municipality is enthusiastically undertaking improvement schemes. The dwellings that have recently been erected for members of the native community are immensely superior to some of the older houses in the poor quarters of the town.

The quarantine regulations and prevention-of-disease ordinances in force in the Dutch East Indies are referred to elsewhere. Medical opinion in Java inclines to the view that the existing port health regulations are in several ways inadequate and unsuitable and would welcome a convention whereby the port health procedure in the ports of the Far East might be made more uniform and more effective than at present. There is also a consensus of opinion that the International Sanitary Convention, even as revised, is not suitable to conditions prevailing in the East. This question of a special convention has been discussed in an earlier chapter of this report. Stress is laid on the importance of throwing the responsibility for carrying out all necessary measures at the port of departure, whenever possible. The fact that there are no less than 257 ports in the Dutch East Indies that are visited by steamships is sufficient explanation of the insistence with which this opinion is put forward. Java expert opinon favours the compulsory fumigation of every ship trading in the Far East once in every three months.

The above summary of certain aspects of the public health problems of the Dutch East Indies is very imperfect and very incomplete, dealing solely, as it does, with matters of special interest to the inquiry. No reference has been made to the excellent new general hospital in Batavia, which can provide accommodation for 1,000 patients. Nothing has been said regarding the Central Government Laboratory in Weltevreden and the Pasteur Institute, which are shortly to be transferred to palatial premises that are approaching completion in Bandoeng, nor of the very excellent work that is being done in these institutions. No reference has been made to the two excellent medical schools in Batavia and Soerabaya respectively; both of these are admirably housed and extremely well equipped. The writer was privileged to see all these and many other similar institutions during his brief stay in Java and was deeply impressed with what he saw.

The tour in Java has left an impression of a keen and enthusiastic civil medical service, well organised and administered, with many marked successes to its credit and a lively appreciation of the importance and the difficulties of the many problems that still await solution. Very real progress has been made during recent years, both as regards research and the applications of the results of research.

Regret is expressed that the nature of this note has not permitted any reference to the many distinguished workers whose observations and results have been very freely drawn on.

The help, advice and co-operation which were received from the Chief of the Civil Medical Service and many of his officers made the task of collecting information remarkably easy and remarkably pleasant.

SUPPLEMENTARY NOTE

There are 275 coastal towns in the Dutch East Indies which have more or less claim to be ɔnsidered "ports" : they all receive visits from steamships. Obviously the vast majority of ıese are extremely primitive, but the number gives a good indication of the extent of the coastline ‹ the Dutch East Indies and the huge amount of coastal trade. For the purpose of port health ıd quarantine regulations these ports are divided into four categories. Ports of the first-class ‹e those which possess a port health officer, a quarantine station, disinfecting plant, and apparatus ɔr the destruction of rats and mosquitos on ships by fumigation. There are five such ports ı the Dutch East Indies, namely, Tandjong Priok (Batavia), Surabaya, Macassar (Celebes), elawan and Sabang; the two latter are in Sumatra.

Ports of the second class are those which have a port health officer, an infectious diseases ɔspital and a disinfecting plant : there are 26 such ports, of which Semarang is one.

There are 56 ports of the third class; in these a European or a native doctor undertakes the ‹amination of ships, passengers, etc., but the ports are not provided with any of the appliances ıumerated above in connection with first- and second-class ports.

Ports of the fourth class are not provided with medical staff or medical equipment of any ind.

Ships infected with plague or yellow fever can only be admitted into ports of the first class nless such ships are provided with an apparatus for the effective destruction of rats and mos- uitos. If they be so provided they are admitted into second-class ports.

"Suspected" ships may be admitted into ports of the first three categories but not into ports ‹ the fourth.

IX — HONG-KONG

The Colony of Hong-Kong is situated 22° 5′ north latitude and 114° east of Greenwich. It consists of the island of Hong-Kong, the peninsula of Kowloon, and some 280 square miles of territory, the so-called "New Territories", that were leased from the Chinese Government in 1898. This territory, contiguous with the Kowloon peninsula, is mountainous and sparsely populated. For its size it has a very long coast-line with very numerous creeks and bays. The land frontier with China is quite short, and is crossed by the Kowloon—Canton railway. The New Territories are provided with most admirable roads, as is the rest of the colony.

The island of Hong-Kong, elongated in shape, with its long axis lying east-west, has an area of 32 square miles. Granite hills occupy the greater part of the island, hills which culminate in a peak rising to a height of nearly 2,000 feet above sea-level.

The town of Hong-Kong consists of two parts : the City of Victoria and Kowloon. The City of Victoria extends in a narrow strip along the northern coast of the island of Hong-Kong for a distance of about five miles. Residential houses, offices, etc., extend southward in terraces up the northern slope of the hills. The magnificent harbour of Hong-Kong separates the City of Victoria from the Kowloon portion of the colony, which is a part of the mainland. A part of the Kowloon peninsula is densely populated. Considerable extensions of the town in this direction have recently taken place, and further very large extensions are projected on land reclaimed from the sea and on sites prepared by levelling adjacent hills. These extensions should do much to relieve the serious congestion of the town.

The island of Hong-Kong is only one of a group of islands and islets clustered close together, and is not even the largest. Most of the other islands, however, are uninhabited and none have any appreciable population.

The climate of Hong-Kong is subject to very much wider fluctuations than one would expect to find in an island situated just within the Tropical Zone. The monthly mean temperature varies between 58° F. in January and 82° F. in August. The relative humidity is likewise subject to considerable variations. The rainfall approximates 90 inches a year; the five months May to September are the wet months, the rainfall in the remaining months of the year being comparatively small.

Below is given in tabular form information regarding the meteorological conditions experienced in 1922, a fairly normal year.

Month	Temperature			Relative Humidity	Rain
	Max.	Mean	Min.		
1921	°F.	°F.	°F.	%	inches
January	64.5	60.5	57.6	81	2.660
February	65.0	61.3	58.1	83	5.490
March	68.5	64.1	61.1	81	3.675
April	75.7	71.0	67.6	81	2.020
May	83.3	78.6	75.4	85	5.495
June	86.5	81.9	78.8	81	6.525
July	87.3	82.5	78.6	81	12.800
August	87.3	82.4	78.8	82	17.535
September	85.7	80.4	76.5	78	9.935
October	80.5	75.5	72.1	74	2.025
November	74.1	68.4	63.4	59	0.535
December	66.8	61.7	57.4	64	0.740
Mean or Total	77.1	72.3	68.8	77.5	69.435

The Port of Hong-Kong.

According to the most recent statistical data available, Hong-Kong is not only the most important seaport of the Far East, but, measured by the amount of tonnage entered and cleared, it is the most important port of the world.

A list of the seven greatest sea-ports in the world (from a list published in the 1923 edition of *Whitaker's Almanack*), arranged in accordance with the amount of tonnage cleared from each, is as follows :

Port	Cleared Tons	Entered Tons	Trade (£ sterling)
Hong-Kong	13,904,534	13,948,083	167,613,388
Hamburg	9,443,000	9,421,000	386,320,000
New York	8,996,354	8,884,527	1,380,245,770
Shanghai	7,906,000	7,810,000	83,009,800
London	6,914,501	13,132,220	606,856,886
Liverpool	6,658,000	7,159,000	528,012,834
Singapore	6,612,000	6,602,000	91,839,200

The figures quoted above are sufficient to indicate the extreme international importance of the public health problems of the Colony.

Medical Administration of the Colony.

The chief adviser to the local Government in medical and health matters is termed the Principal Civil Medical Officer. He is responsible for the administration of the Government hospitals, asylums, laboratory, and similar institutions, and such port health work as is done is carried out under his control and supervision. He is responsible likewise for such medical and sanitary activity as is carried on in the New Territories outside the area controlled by the Sanitary Board

The Sanitary Board.

There is no municipality properly so called in Hong-Kong; most of the work that would fall to the lot of a municipality in towns of this size is entrusted to a Sanitary Board. The president of this board, the head of the sanitary department, is a member of the Colonial Civil Service. He has no medical qualifications. As members of the Board, there are the Director of Public Works, the Secretary for Chinese Affairs, the Medical Officer of Health for Hong-Kong, the Deputy-Director of the Army Medical Service, a local private medical practitioner, and two European and two Chinese "unofficial" members. The Medical Officer of Health works directly under the head of the Sanitary Department and is not subject to the control of the Principal Civil Medical Officer of the Colony.

The area coming under the jurisdiction of the Sanitary Board consists of the island of Hong-Kong (32 square miles), the peninsula of Kowloon (2 3/4 square miles) and some 16 square miles of the New Territories. The Medical Officer of Health has one medical assistant who is in charge of the public health of Kowloon.

The City of Victoria is divided into eastern, central, west-central and western districts, each with a sanitary office, and further subdivided into ten health districts, each in charge of a sanitary inspector. Kowloon has three sanitary offices and is subdivided into five districts, with a sanitary inspector in charge of each. Outlying villages in the area controlled by the Sanitary Board are controlled, in so far as public health and buildings ordinances are concerned, by police officials having the title of rural sanitary inspectors. In addition to these there are inspectors to supervise refuse collection, water supply, public cemeteries, markets, night-soil removal, etc.

The infectious diseases hospital in the City of Victoria comes under the jurisdiction of the Principal Civil Medical Officer, as do the public health laboratory and the public mortuaries.

The Kennedy Town Infectious Diseases Hospital is situated in the west-end of the City of Victoria. The site of the hospital is good; the building, though not constructed or designed for use as a hospital, is not ill adapted for the purpose. The most obvious defect is the absence of any disinfecting plant for the disinfection of infected bedding, clothing and the like. This is taken away by the Medical Officer of Health's Department and treated in a disinfecting station which is under the administration of the Sanitary Board. There are two such disinfecting stations, one in Victoria and one in Kowloon. They are equipped with high-pressure steam apparatus.

The Kennedy Town Hospital has accommodation for some thirty patients; it was empty at the time of inspection. It is reserved chiefly for the non-Chinese members of the community. Cases of fever of the typhoid group are admitted into the Civil General Hospital and other civil hospitals in the town.

The Chinese Infectious Diseases Hospital is situated close to the Kennedy Town Hospital. It has been used chiefly for smallpox in recent years. It is financed and administered by the Chinese community, but inspected from time to time by Government medical officers. There was only one patient at the time of our visit, a convalescent case of smallpox. The building is in disrepair and as an infectious diseases hospital the buildings are thoroughly bad. Here also there is no disinfecting plant of any kind.

Proposals are on foot to construct a new smallpox hospital. Satisfactory hospital accommodation for infectious diseases is certainly very badly wanted.

Housing.

It is doubtful whether half the population of the Colony could be satisfactorily housed in the buildings at present available for the purpose. The ever-increasing prosperity of the town attracts ever-increasing numbers of immigrants, and building has failed to keep pace with the demand for accommodation. Sites are scarce, and land available for building is exceedingly costly. Very much is being done in the matter of reclamation, which will provide room for expansion, but, even so, it is not easy to foresee the time when the housing conditions of the city will be altogether satisfactory. The problem is one of great difficulty. A large, prosperous, thriving seaport town has grown up where there is no room for it. Kowloon can and will grow and expand, but even here sites have to be made by cutting down hills or reclaiming the seashore. The business centre of the town will remain in Victoria City and it is here that overcrowding will be extremely difficult to abolish.

The death returns are sufficient evidence of the evils attendant upon overcrowding. Not far short of half the total deaths reported among the Chinese are accredited to diseases which can be described as "respiratory". Tuberculosis is very widely prevalent.

The design of the houses in the older, more densely populated portions of the town could not well be worse. They have a narrow, fifteen-foot, frontage on to a street that is often much too narrow; they are for the most part three- or four-storeyed buildings with a depth from back to front of three or four times their width. The ground floors are commonly used for trade purposes. Upstairs the "tunnels" are very commonly divided into small cubicles in which light and air are altogether insufficient. Such property is very valuable. A bunk in such a dwelling commands a good price. The bylaws cannot be enforced in existing circumstances : people must find shelter somewhere. Improvements have been and are being made, chiefly in the direction of providing more air space in the rear of such dwellings, but they can never be made satisfactory abodes for the number of people they shelter at present. More recently constructed dwellings are very appreciably better, but it will be difficult to evolve an altogether desirable type of dwelling in a town where land is so scarce. The solution may ultimately be found in some form of "sky-scraper".

Water Supply.

The water supply of the Colony is good. The hills in the island of Hong-Kong serve as a catchment area for the water supply of the island. All the water is submitted to slow sand filtration. The water is submitted to monthly bacteriological and chemical examinations, the results of which are stated to be uniformly satisfactory. Hilly country in the New Territories serves as an excellent catchment area for the water supply of Kowloon. From this latter supply, water for all ships in the harbour is provided. This water also is passed through slow sand filters. In exceptionally dry months it occasionally happens that there is insufficient water for the supply of all ships.

Drainage, and Night-soil Removal.

There is a water-carriage system of drainage in only a very small section of the City of Victoria. There are three water-flush public latrines in the city of satisfactory design. Hand removal is the system employed in by far the greater portion of the Colony. The night-soil is removed in junks to the mainland, where it is used as manure, chiefly for mulberry trees. There is at present in the island insufficient water for any early considerable extension of the water-carriage system of drainage.

Surface drains are for the most part well designed and well constructed.

Scavenging.

Scavenging of the streets appears to be efficiently carried out. The house-fly is but little in evidence. The markets are well cared for and supervised.

Population.

The population of the Colony, according to the census taken on April 24th, 1921, is as follows :

Island of Hong-Kong	347,401
Kowloon Peninsula	123,448
New Territories, North	66,114
New Territories, South	17,049
Floating Population	71,154
	625,166

The population in 1911 amounted to 456,739 and in 1906 to 329,038, figures which demonstrate the rapid rate at which the population of the Colony is increasing. The population of the island of Hong-Kong alone increased from 191,969 in 1906 to 235,597 in 1911 and to 347,401 in 1921, an 80 per cent increase in fifteen years.

Nearly 98 per cent of the population are Chinese.

One remarkable characteristic of the population of Hong-Kong relates to the abnormal sex ratio. At the last census the males numbered 382,507 and the females 242,559, an excess of males of 70,024. In other words, there are three males to every two females in the Colony.

The population is in a large measure a migratory one, and there is a constant interchange of population with China. In 1921, river steamers and railway brought 906,000 persons from Canton and took 896,000 persons back. In 1922, immigrants and emigrants, by these two routes alone, numbered 1,171,000 and 1,159,000 respectively. Over and above all this a large number of people enter and leave the Colony each year by junks, steamships, etc. These figures afford some idea of the extent of the human intercourse with China. The facilities thus afforded for the interchange of infection of human communicable diseases are obvious.

Birth and Death Registration.

The registration of births and deaths is compulsory, as is the notification of cases of the more important communicable diseases. The registration of births, however, is so imperfect that a discussion of the published figures indicating birth-rates is hardly worth while. It is otherwise

with the death reports, and the figures indicating the total deaths from all causes are a very close approximation to the truth. In the conditions prevailing it would be extremely difficult to bury, or otherwise dispose of, bodies unobserved. Death certificates are necessary before permission to bury a body is accorded. If there be doubt as to the cause of death, the medical officer of health, or his deputy, views the body, and takes steps to obtain a post-mortem examination should such a procedure appear to be necessary. During 1921, 3,471 post-mortem examinations were made in the Victoria public mortuary, and 1,368 in the Kowloon mortuary. (The examination of rats is also carried out at these mortuaries. Reference to this rat examination is made elsewhere in this note.)

When discussing death-rates, however, three facts must be borne in mind. In the first place it is difficult, if not impossible, to form an accurate estimate of the total population at any given time; migration is too extensive and too irregular. In the second place, it is not uncommon for Chinese members of the population to leave Hong-Kong for China when they are suffering from grave or incurable diseases. Thirdly, the numbers of children, of old people and of adult females are less, and of young and middle-aged male adults more, than one would find in a normally constituted population. For these reasons, a comparison of the death rates of Hong-Kong with those of other towns must be made with caution.

Deaths.

Below is given in tabular form the recorded death rates per 1,000 population for the last thirteen years :

1910	21.76	1914	23.34	1918	24.40
1911	20.74	1915	18.59	1919	23.20
1912	25.67	1916	24.00	1920	21.19
1913	21.16	1917	23.40	1921	20.27
				1922	25.16

In 1921 the total number of deaths in the Colony was 11,880; in 1922, 14,569 deaths were recorded. These totals included 3,766 deaths of children under one year of age in 1921, and 4,216 in 1922, numbers in appreciable excess of the total number of births recorded during these years.

When one considers the constant stream of people arriving in the Colony from Canton, one of the largest cities of China, in which there is, or was, nothing in the shape of modern public health administration, one can but wonder at the low death-rates recorded in Hong-Kong, wonder which is increased when one sees the overcrowded and insanitary conditions in which a large proportion of the population lives in the more crowded quarters of the town.

To respiratory disease are attributed more deaths than to any other cause. In 1922, respiratory diseases were responsible for 4,863 deaths. Broncho-pneumonia and lobar pneumonia were responsible for more than half of these deaths. In addition to the above, 2,096 deaths were attributed to tuberculosis, 14.38 per cent of the total deaths registered. The excessive prevalence of tuberculosis among the Chinese population of Hong-Kong is the most serious aspect of public health conditions in the Colony. No less than 43 per cent of the Chinese deaths in 1921 and 1922 were ascribed to either respiratory disease or pulmonary tuberculosis.

Compared with tuberculosis, malaria, though prevalent, is an unimportant cause of sickness and mortality. Only once during the last ten years has the reported malaria death-rate been as high as one per mille. In 1920 and 1921 the malaria death rate amounted to 0.59 and 0.55 per mille respectively.

Beri-beri is of frequent occurrence and is an important cause of sickness and death. In 1921, 4.42 per cent of the total mortality was attributed to beri-beri (526 deaths); in 1922, 5.69 per cent (829 deaths).

Of the notifiable infectious diseases, the following were most in evidence during 1921-1922. The number of cases notified is given against each :

	1921	1922
Smallpox	191	212
Plague	150	1,181
Cerebro-spinal fever	125	53
Enteric fever	115	139
Diphtheria	85	71
Paratyphoid fever	78	27
Cholera	5	1

Of the above, plague, smallpox, cholera and cerebro-spinal fever call for special remark.

Plague.

The history of plague in Hong-Kong presents several features of interest. Hong-Kong was infected apparently from Canton in 1894 at an early stage of the present pandemic, and it is by no means certain that the rat population of the Colony has ever been free from infection since that date. Below is given in tabular form the monthly incidence of plague cases notified during each of the last fifteen years :

Month	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
January	9	0	0	0	9	2	47	0	1	1	0	4	0	2	13
February	5	7	0	0	24	3	42	3	1	2	0	1	1	6	23
March	15	15	0	0	73	6	223	0	3	0	0	30	0	1	74
April	92	21	4	16	317	29	637	6	6	1	2	94	9	5	247
May	*416*	31	5	53	*759*	61	*858*	*42*	*10*	*14*	44	*171*	28	28	*454*
June	405	40	7	*113*	508	79	248	31	6	10	*84*	132	*56*	*64*	237
July	105	8	6	61	144	*84*	55	31	3	9	*103*	26	20	24	77
August	21	4	3	21	19	62	25	16	2	1	23	4	14	6	29
September	2	0	0	1	4	34	10	4	4	0	6	0	0	3	8
October	0	0	0	1	0	16	0	7	1	0	2	1	4	0	7
November	2	1	0	3	0	9	0	3	1	0	1	1	3	6	10
December	1	0	0	4	0	23	1	1	1	0	1	0	3	5	2
TOTAL	1,073	127	25	273	1,857	408	2,146	144	39	38	266	464	138	150	1,181

The above table indicates that the seasonal prevalence of the disease has remained remarkably constant. All the outbreaks of any severity, with the exception of that of 1918, have reached their height in the month of May or June. It will further be noted that, during these 15 years, the annual plague incidence exceeded 1,000 on only four occasions. The outbreak of 1914 was the most severe, when 2,146 cases were recorded. Next on the list comes 1922, with 1,181 reported cases. In each of three years the number of cases reported was less than 100. During the last three years there have been only four months in which no human case of plague has been recorded. The longest plague-free period experienced was at the end of 1917 and the beginning of 1918, when seven consecutive months elapsed without a single case being notified, and six months without the detection of a single plague-infected rat. This circumstance, taken in conjunction with the fact that the outbreak of 1918 reached its height two months later than normally, inclines one to the belief that Hong-Kong was for a time, and perhaps the only time during the last decade, completely free from plague infection. In 1910-11 seven consecutive months were likewise free from human plague, but infection among the rats was detected in each of these months with the exception of December.

If the above assumption with regard to 1917-18 be justified, it is unfortunate that the absence of measures to prohibit re-importation of infection allowed no advantage to be taken of a unique opportunity of ridding Hong-Kong more or less permanently of plague infection. The history of the disease in Hong-Kong indicates that such favourable opportunities are unlikely to recur at very frequent intervals.

Rats.

No systematic rat campaign on any large scale is carried out in Hong-Kong. Rat-bins are distributed throughout the city for the reception of any rats killed or found dead. These rats are collected daily and are sent to the public mortuary for examination. Poison baits are distributed periodically and are said to add appreciably to the number of rats collected in the bins. In this way the locality from which plague-infected rats come is noted, but not the individual house. Past experience has shown that measures consequent upon the discovery of plague-infected rats in a dwelling-house meet with lively opposition on the part of the Chinese, and so defeat the prime object of obtaining early information of plague infection.

During the 16 years 1906-1921 inclusive, 1,345,864 rats were examined, an average of 84,000 rats a year. Three-quarters of these rats were collected in Victoria City, the remainder in Kowloon. Records for past years do not state the species of all rats examined, but one learns that the proportion of *R. decumanus* to *R. rattus*, the only two species present in Hong-Kong of any importance from the plague point of view, is approximately as 3 is to 2. During the 13 years 1909-21 inclusive, the number of rats found infected was exactly 3,000. Of this number, 2,360 were *decumanus* and 640 were *rattus*.

The largest number of plague rats discovered in any one of the last sixteen years was 652 in 1914. In 1921 only seven plague-infected rats were discovered, and in 1922 only six, the lowest numbers of any year of the series under consideration. In certain years the number of plague rats found has exceeded the number of human cases reported, a somewhat remarkable fact in view of the manner in which the rats are collected.

A consideration of all the available data justifies the assertion that the human incidence of plague in the Colony of Hong-Kong is an inadequate index of the severity of the rat epizootic. This fact is probably due to the greater prevalence of *decumanus* than of *rattus* and the greater severity of the epizootic among the former species. *Decumanus* is not nearly so domesticated a rat as is *Rattus rattus*, and normally does not come into close association with human beings. It is quite possible to have a severe rat epizootic without any human plague if *decumanus* be the only species prevalent.

But few observations have been made regarding the species and the number if fleas infesting the rats of Hong-Kong, and it is not possible to say, on the data available, whether a seasonal prevalence of rat-fleas is capable of explaining the constant seasonal prevalence of plague to which brief reference has already been made.

In Hong-Kong the months of maximum human-plague incidence are the months of maximum rainfall. It is quite possible that heavy downpours of rain normally experienced in these months may drive *decumanus* from the drains, gulleys, etc., which are the normal habitat of this species. The more intimate contact of *decumanus* with *rattus* and human beings thus established may possibly be a factor of importance in determining the seasonal incidence of human plague cases in Hong-Kong.

Plague-Preventive Measures.

There is not very much to be said under this head with regard to Hong-Kong. In addition to the anti-rat measures that have been described, the general cleansing and disinfection of houses from which plague cases have been reported is almost the sole direct anti-plague measure now enforced. Inoculation with a plague vaccine does not find favour. In justice to the local authorities, it must be said, however, that since plague infection was introduced into the Colony towards the end of the last century, very appreciable improvements have been carried out in the dwelling-houses in some of the most insanitary quarters of the town. A large number of ceilings have been abolished; the double wall which affords admirable shelter for rats is less in evidence than formerly; the ground floors of most houses are constructed of material impermeable to rats; and, finally, building by-laws now make it impossible to reproduce the very unsatisfactory dwelling-houses that were being built half a century and less ago. In spite of the structural improvements effected, shelter and food for rats still exist in abundance in most of the inhabited parts of the Colony, more especially in the overcrowded, dirty dwellings which house the poorer members of the community and in the innumerable storehouses for grain and similar produce that are scattered widely throughout the town.

Notwithstanding the abundant rat population of Hong-Kong, and notwithstanding the constant prevalence of plague infection among the rats, it must be acknowledged that plague in Hong-Kong, as a human disease, sinks into insignificance when compared with such a disease as tuberculosis. It is otherwise, however, when the matter is considered from an international point of view. Viewed thus, plague is by far the most important disease which affects Hong-Kong. At the present time, very little, if anything, is done in Hong-Kong to interfere with the abundant facilities which exist for the export of plague infection to many parts of the world. This is a matter which more properly belongs to the port health section of this note, but for convenience it will be considered here.

It should be remembered that there is no disease about which we have now more detailed information with regard to causation and mode of spread than about bubonic plague. The experience of the last twenty years has shown that plague infection is conveyed by shipping from place to place with considerable difficulty, but when once infection has been successfully implanted in a large seaport town, heroic measures are often necessary for its eradication. As illustrations of this statement, the following examples may be cited : Macassar, an important port in the Dutch East Indies, with constant and large trade communications with many plague-infected ports, experienced its first outbreak of plague recently. Surabaya, the most important port of Java, remained free from plague till 1911 in spite of close communication with plague-infected ports for 17 years : Surabaya has remained plague-infected ever since. Singapore remained free from the disease till 1901, seven years later than Hong-Kong's first infection; the rats of Singapore have suffered from plague ever since. Colombo and Rangoon are other cases in point, and the city of Madras still remains free from plague.

An explanation of all this is not far to seek. In order that plague infection may be successfully transferred from one port to another, many favourable conditions are necessary. The chain of events is usually somewhat as follows : A rat either suffering from plague or in the incubation period of plague has to gain access to a ship containing a reasonably large rat population. Alternatively, infected rat-fleas in cargo favoured by rats have to be placed in such a vessel. A rat epizootic is started among ship rats. On arrival at the port of destination, a rat or rats suffering from plague, or in the incubation period of the disease, or infected rat-fleas, have to be put ashore, in circumstances which will permit of their coming into early contact with shore rats. In most towns of the East, grain-stores harbour more rats than any other type of building, and for this reason, grain is almost always the vehicle by which plague infection is transferred over long distances from place to place.

Enough has been said to indicate the measures which might be taken to prevent the transference of plague infection by ships from a port in which the rats are infected. Such measures might be classified as follows :

(1) The storage of grain and other merchandise likely to be rat-infested in such a manner as to eliminate the rat : "rat-proofing" as ordinarily practised is not sufficient. In the conditions existing in Hong-Kong, the problem is difficult and its solution might well be prohibitively costly. All the same this matter should be borne in mind when new buildings and town extensions are under consideration.

(2) Eliminating the rat from, or diminishing its prevalence in, lighters and junks used for conveying merchandise from the shore to the sea-going vessel, by periodic (three-monthly) fumigation. This is not nearly so formidable a task as appears at first sight. That it is possible in the conditions existing in Hong-Kong is apparently shown by the procedure adopted by private agency in the case of vessels bound for United States ports loaded in Hong-Kong.

(3) Systematic reduction of the rat population in all vessels trading with plague-infected countries by thorough fumigation at intervals not exceeding six months. This measure is enforced by the Regulations of the United States, is also practised in the Dutch East Indies (three-monthly) and in Shanghai, and will be incumbent on all signatories of the revised International Sanitary honvention.

(4) The adoption of simple precautions to prevent ship rats coming ashore and shore rats going on board ship.

None of the above measures necessitate unjustifiable or vexatious interference with shipping. None are impossible or even difficult to carry out in a well-equipped port, excepting perhaps the satisfactory storage of grain and similar rat-favoured merchandise. If it be impossible to store such merchandise in satisfactory conditions, measures would have to be taken to free it from rat and flea infestation preferably before being put on board, but alternatively by fumigating the vessel in freight. The latter procedure is carried out by private agency in the case of vessels bound direct from Hong-Kong to ports in the Dutch East Indies.

In Hong-Kong, there is but one Clayton gas apparatus for the fumigation of ships at the disposal of shipping in the harbour, and this is owned and run by a private firm; fumigation with this apparatus is only very exceptionally supervised by the Port Health Authority; consequently the Port Health Officer is not in a position to give certificates of fumigation required by the health authorities of many ports with which Hong-Kong is in intimate trade communication. No attempt has ever been made either to estimate or to diminish the rat population of the junks frequenting the harbour of Hong-Kong (the procedure adopted by private arrangement to satisfy United States quarantine regulations excepted), though it has been by no means an uncommon experience to find plague cases among the floating population of Hong-Kong harbour. No attempt is made to ensure that merchandise from plague-infected godowns is freed from rats and rat-fleas before or after such merchandise is put on board ship. No similar measures are taken to prevent the introduction of fresh plague infection into the wharves or godowns of Hong-Kong. Had such measures been enforced in 1917-18, it might have been possible to take advantage of the plague-free period referred to above. The by-law under the Public Health and Building Ordinance 1903 (No. I of 1903) relating to the prevention of the dissemination of plague by rats is still in force, but it does not appear to be very carefully observed. Finally, the quarantine regulations of Hong-Kong contain no reference to the destruction of rats on board ships or in harbour areas : under these regulations, the occurrence of rat plague on board a ship does not necessitate, or even permit, such ship being considered an "infected vessel".

Cholera.

Published reports show that cholera has been a very unimportant cause of mortality in Hong-Kong during recent years. In view of the satisfactory water supply of the Colony, this disease is little likely to be a very serious menace to the public health, but precautions are necessary. The following table indicates the total number of cholera cases reported during each of the last eleven years :

Month	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
January	1	0	0	0	0	0	0	0	0	0	0
February	0	0	1	6	0	0	0	0	0	0	0
March	0	5	16	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0	0	0	0
May.	0	0	1	1	0	0	0	0	0	0	0
June.	0	0	0	0	0	0	0	0	0	1	0
July	0	1	0	0	0	0	0	7	0	0	0
August.	0	53	0	0	9	0	0	9	1	1	0
September	0	29	1	1	1	0	0	27	0	3	1
October.	0	26	0	8	0	0	0	3	0	0	0
November	0	1	0	1	0	0	0	0	4	0	0
December.	0	1	0	0	0	0	0	0	1	0	0
TOTAL . . .	1	116	19	17	10	0	0	46	6	5	1

It will be noted that, with the exception of a small outbreak in 1919, the last six years have been practically cholera-free. Only one case was reported in 1922.

The small outbreak of 1919 was responsible for 46 notified cases, of which 41 occurred among the Chinese population. There was one European case. Of the 46 cases reported, 42 died. It is of interest to note that an epidemic of "gastro-enteritis" was also reported in 1919. This out break resembled cholera clinically, but attempts to isolate the cholera vibrio from the excreta of the patients failed. There were 339 deaths ascribed to "gastro-enteritis" during 1919.

Although the satisfactory water supply is sufficient to explain the immunity from serious epidemics which Hong-Kong has enjoyed, it is nevertheless remarkable that the incessant interchange of population with Canton has not been responsible for more frequent sporadic cases and small contact outbreaks. One must assume that cholera is almost an unknown disease in Canton also. Should Canton, however, have the misfortune to be afflicted with a severe outbreak of cholera, a serious situation might well arise in Hong-Kong which would strain the resources of the present public health department to their utmost. At present the most important possible source of infection arises from the large number of immigrants arriving in Hong-Kong from more distant ports and emigrants passing through. As is stated in another part of this note, Hong-Kong has at present no quarantine station suitable for the accommodation of cholera contacts. In the past, such contacts have from time to time been accommodated in the Kennedy Town Infectious Diseases Hospital, which by good fortune was not occupied by smallpox patients when required for the purpose. Fortunately too, the arrival of cholera-infected emigrant ships appears to have been less frequent in Hong-Kong than in most other Oriental ports with considerable emigration traffic. During 1921 only one cholera-infected vessel arrived in the port. This boat came from Shanghai with a cholera case on board : the contacts were detained five days. It would be hazardous in the extreme for the Hong-Kong health authorities to rely on the continuance of such good fortune as they have enjoyed in the past, given the conditions prevailing in other parts of

the East with which Hong-Kong has intimate trade relations. An adequately-equipped quarantine station, wherein the contacts of cases of serious communicable diseases may be kept under observation, is an urgently required addition to Hong-Kong. Two newly-constructed two-storied barracks at Lai Chi Kok are available for the accommodation of such people. The position of these barracks, however, immediately above a gaol which, in its turn, is situated immediately above the slow-sand filter used for the purification of the water supply for ships in the harbour, is sufficient to condemn these buildings as a fit and proper place for the housing of persons suspected of harbouring infection of such a disease as cholera.

Smallpox.

The following statement gives the number of smallpox cases notified each month during the past 11 years :

Month	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
January	163	26	3	2	1	358	2	2	2	1	8
February	254	23	8	3	34	176	6	6	1	11	33
March	156	27	29	11	63	38	13	3	10	36	25
April	96	18	42	7	72	18	4	9	11	58	54
May	23	10	19	9	70	1	2	4	6	58	61
June	3	4	4	0	22	1	2	2	3	15	19
July	6	0	1	1	7	0	1	0	1	0	8
August	0	1	1	1	9	1	1	0	0	4	2
September	2	0	0	0	16	0	0	0	0	0	1
October	0	1	1	0	22	0	0	0	0	3	0
November	2	0	1	0	68	0	0	0	0	0	1
December	4	1	1	0	328	2	1	1	0	5	0
TOTAL	709	111	110	34	712	595	32	27	34	191	212

None of these years has been altogether free from the disease, though the case incidence was as low as 27 in the year 1919. The two years of maximum incidence were 1916 with 712 cases and 1912 with 709 cases. The epidemic of the winter 1916-1917 was the most severe which Hong-Kong has experienced during recent years. The early months of the year are almost invariably the months of maximum smallpox incidence, the last six months of the year being usually almost free from the disease. Last year, 1922, there was an outbreak of some severity and 212 cases were notified.

There is no active opposition on the part of the Chinese to vaccination, but, owing to the ever-changing population, it would be difficult to ensure that the population of Hong-Kong were in a well-vaccinated condition at any given time. Any attempt at universal infant vaccination is made extremely difficult by the fact, already referred to, that birth notification among the Chinese population of Hong-Kong is so defective as to be almost non-existent. During the outbreak of 1916-1917 an energetic vaccination campaign was carried out and no less than 300,000 Chinese were vaccinated or re-vaccinated. A similar campaign on a smaller scale was carried out in the early months of 1922. Normally, vaccination is performed by private doctors or at the hospitals, dispensaries and the like. There is no Governmental agency exclusively devoted to vaccinating the civil population.

All Chinese labour forces leaving the Colony are vaccinated before departure. This work is in the immediate future to be entrusted to the Port Health Authority—undoubtedly a step in the right direction and an improvement on the present practice. During the year 1921 seven ships infected with smallpox arrived in the harbour. When such a ship arrives, the patients are removed to the infectious diseases hospital and all the contacts are vaccinated. In the quarantine regulations of Hong-Kong it is laid down that the passengers and crew of such infected vessels shall be kept under observation or under surveillance for a period not exceeding ten days from the date of arrival of the vessel in the Colony. Cabin passengers staying in Hong-Kong are reported to the medical officer of health, who can arrange for their surveillance, but hitherto there has been no accommodation for deck passengers and it has not been found possible to keep them under observation. It is undoubtedly these deck passengers who are of most importance from the point of view of the spread of infection, and it is extremely desirable that facilities be afforded the port health authorities for carrying out the by no means stringent quarantine regulations of Hong-Kong in their entirety.

Should Canton, Wuchow, or Macao suffer severely from smallpox, the ever-present dangers of smallpox infection would be very considerably increased. The river steamers from these three ports are not visited by port health officers as a routine, nor are the numerous junks and smaller craft coming from these ports. The occurrence of infectious disease on board these steamers should, and might, be reported by the captain, in which case the vessel would be treated as an "infected ship" in the usual manner.

Cerebro-spinal Meningitis.

This disease made its appearance in the Colony in epidemic form in the beginning of 1918; it was first diagnosed in February of that year, since which date no month was completely free from the disease until 1922. In 1922, 53 cases were reported. The monthly incidence of the disease in the five years 1918-1922 is set out in the following table :

Month	1918	1919	1920	1921	1922
January	0	23	18	5	8
February	165	32	13	9	13
March	454	71	40	59	4
April	274	58	44	18	4
May	146	24	10	8	3
June	96	15	7	10	4
July	52	13	4	7	4
August	14	12	6	3	1
September	10	3	5	1	0
October	5	1	7	1	4
November	7	7	3	1	3
December	9	8	1	3	5
TOTAL	1,232	267	158	125	53

It will be noted that the outbreak of 1918 was much the most severe, since when each year has shown a markedly diminished prevalence. The highest number of cases reported in any one month was 454 in the month of March 1918. The first six months of the year have been the months of maximum incidence, the last half of the year being relatively free from the disease. This seasonal prevalence is very possibly due to an aggravation of the evils attendant upon the excessive overcrowding of Hong-Kong caused by closing windows and other air inlets and outlets during the cold months. In the warmer months, the number of people that sleep in the open air directly diminishes such overcrowding.

The outbreak of 1918 was investigated by Dr. Olitsky of the Rockefeller Institute, who submitted an interesting report on his findings. Perhaps the most important practical result arising from his investigations is the fact that the local Government is now provided with large stocks of locally prepared anti-meningococcic serum of high therapeutic value.

The constantly diminishing incidence of this disease in housing conditions eminently favourable to its propagation postulates a high degree of immunity of the local population.

Typhus Fever.

It is not uncommon to find mention of typhus fever cases in the medical reports of the Colony of some twenty years ago. During recent years, however, no indigenous cases of typhus fever have been reported, though from time to time cases are imported from Canton. No case has been notified during the last two years. The Chinese population of Hong-Kong is not heavily louse-infested.

Relapsing Fever.

Cases of relapsing fever are reported from time to time. There was one case in 1921 and five in 1922. Infection is generally imported; indigenous cases are rare.

Influenza.

The primary object of referring to this disease is to call attention to the extremely noteworthy fact that Hong-Kong enjoyed an astonishing immunity to influenza during the world-wide pandemic of the closing months of 1918. Had the disease prevailed in Hong-Kong in similar form and with the same intensity as it did in many parts of British India, the mortality that it would have caused in the crowded parts of Hong-Kong city is terrible to contemplate. The total deaths attributed to influenza notified in 1918 amounted to only 405 : the figures for the four following years are 449, 542, 303 and 422, respectively.

Yellow Fever.

Yellow fever has, of course, never been reported from Hong-Kong. *Stegomyia fasciata* and *scutellaris* are both prevalent in the Colony—in the island as well as on the mainland.

Port Health Procedure in Hong-Kong and Quarantine Regulations.

There are two European medical officers engaged on port health duties in Hong-Kong, a port health officer and an assistant. Their work is carried on under the direction of the Principal Civil Medical Officer of the Colony. Procedure is guided by the Quarantine Regulations made under Section 23 of the Merchant Shipping Ordinance of 1899.

In practice all the work of the Port Health Department falls under three heads : The inspection of ships arriving in port; the medical examination of emigrants; and quarantine duty.

Inspection of Ships arriving in Port.

During 1921, 3,778 ships arrived in the harbour and were boarded by the port health officer or his assistant. Any cases of sickness that had occurred during the voyage were entered on the prescribed form and attested by the master and the ship's surgeon. The river steamers from

Canton, Macao and Wuchow are not boarded by the health officers unless cases of infectious disease are reported therefrom.

Medical Examination of Emigrants.

This branch of work occupies a very considerable portion of the time of the port health staff. During 1921 no less than 155,994 emigrants were examined. The largest number of these emigrants go to the Straits Settlements, 85,908 in 1921. The Dutch East Indies and British Columbia took 24,288 and 12,915 respectively. Of the 1,383 emigrants that were rejected during 1921 as a result of medical inspection, 500 were rejected on account of "fevers", 458 for trachoma, and 274 for scabies.

Quarantine Duty.

All vessels arriving from infected ports are submitted to special examination, as are all vessels having cases of infectious disease on board. All such vessels fly the "Q" flag and proceed to the quarantine anchorage, where the examination takes place. During 1921, 415 ships arrived in the quarantine anchorage. Of this number eight ships were detained : one for cholera, the remainder for smallpox. One ship had three cases of smallpox on board; all the other detained vessels had single cases. The "infected ports" during 1921 were : Bangkok (cholera); Formosan ports (cholera); Saigon (cholera) and Shanghai (smallpox).

During the year 1921, the port health officers "examined" 263,827 individuals : 155,994 emigrants; 51,990 Asiatic crews; and 55,823 arrivals from "infected ports". This is a large number for two medical officers without assistance, in addition to all other port work. The absence of adequate "quarantine station" or detention camps, and the fact that the port health authorities do not possess facilities of their own for the fumigation of vessels have been commented upon in other parts of this note. It has also been stated that the duty of vaccinating emigrants is shortly to be entrusted to the Port Health Authority. It would seem probable that the port medical officers will have to have a staff at their disposal if they are to perform their functions adequately.

The Quarantine Regulations take cognisance of cholera, choleraic diarrhœa, smallpox, typhus fever, yellow fever, bubonic plague, and any other disease which the port health officer "may consider to imperil the safety of the passengers or crew". The definitions of "infected vessel", "suspected vessel" and "healthy vessel", "observation", and "surveillance" are "orthodox". The regulations provide for the "observation" of passengers and crew of an infected vessel, a provision which cannot in existing conditions be always observed. Observation periods for the chief diseases are : 10 days for smallpox; yellow fever 6 days; cholera and plague 5 days—all reckoned from the date of arrival of the vessel in the waters of the Colony. Any vessel carrying passengers in a filthy or otherwise unwholesome condition may be sent to the quarantine anchorage by the port health officer. On the whole the regulations appear to be inadequate to the importance of the trade of the port. One of the most important omissions relates to rat plague. The word "rat" is not mentioned once in the Quarantine Regulations of Hong-Kong, though the colony has been consistently infected with plague since 1894.

A Report on

PRESENT HEALTH CONDITIONS IN CANTON AND SHAMEEN

by Dr. H. F. Smith

The city of Canton, one of the treaty ports of China, is located on the Si Kiang (West River) 91 miles from Hong-Kong, from which city it is reached either by rail (in four hours) or by boat (in about eight hours).

Population :

On land.	710,112
On water (barges, etc.)	59,637
Total.	769,749

The above figures were furnished, through the Port Medical Officer, by the Commissioner of Customs, Chinese Maritime Custom Service, and are the most accurate obtainable. They apply only to the police area of the city. There is considerable population in the districts immediately adjoining the municipality, but no estimate of the numbers can be obtained.

It is estimated that, during 1922, both emigration and immigration between Canton and Hong-Kong each exceeded 1,000,000 persons—a number which exceeds the actual population of either of the two cities. With the cities of Hong-Kong and Canton separated by only four hours travel by train and eight hours travel by boat, it will readily be recognised that any condition relating to the epidemic diseases existing in Canton cannot fail to have its effect on Hong-Kong and Kowloon, and vice versa.

Municipal Health Work.

In February 1921 the Municipal Board of Health of Canton was organised, consisting of four departments under a Commissioner of Health. The four departments were as follows :

1. Sanitary Bureau,
2. Bureau of Vital Statistics,
3. Bureau of Infectious Diseases,
4. Bureau of Education.

Shortly after the inauguration of this department, however, the city of Canton was the seat of revolution and counter-revolution to such an extent that the Department of Health was never developed, nor ever existed, except in name. While the regulations of the Municipal Board of Health, when drafted, provided for the reporting of all births, deaths and cases of communicable diseases, no attempt has ever been made to enforce the requirements. At present no records are kept of births, deaths or cases of any disease, as none are ever reported. The only means of determining the presence of an epidemic of any nature would be by such an increase in the number of deaths that occur as to cause comment among the general population. There is at present no Commissioner of Health, nor any organisation of any nature to handle, or to attempt to control, any outbreak of disease regardless of its nature. There are absolutely no records of any kind known to be in existence relating to births, deaths or the prevalence of any disease in Canton, except those private records kept at the several missionary hospitals.

Water Supply.

Some years ago, the city installed two small slow-sand filters, the source of water for these filters being from the river. The capacity of the filters is far inadequate for the city's needs, and may be said to exist in name only, with practically no control over their supervision or operation. Occasional bacteriological counts on the filtered water have been done by the Port Medical Officer, who states that there is practically no difference between the filtered water and the raw in the river, except that the filtered water may be somewhat clearer than the water in the river. The floating population use unfiltered river water entirely. There are a large number of shallow wells in the city.

Sewerage.

The city is not sewered. Night-soil removal, when performed, is done by hand. During the past three months there has been no systematic removal of night-soil, feces being disposed of in any way which the population desires. A few coolies were seen carrying open cans of night-soil through the streets with little care as to whether or not the contents of the cans were spilled on sidewalks, roads or pedestrians. Open latrines abound, especially around the outskirts of the town and vie with those found north of the international settlement of Shanghai in reference to odours and physical conditions.

Hospitals.

There is one Chinese hospital, at least so called, of about 800 beds. The institution is really, however, an almshouse, conditions in which are extremely poor. There are several missionary hospitals, one of which is the oldest established missionary hospital in China, having been organised in 1834. With the exception of typhoid fever, however, contagious diseases are not admitted to these institutions. Prior to the last twelve or fourteen months, there was located near the northern entrance of the city an isolation hospital to which cases of plague and cholera were sometimes removed. Conditions were said to be extremely primitive at best. The institution is now abandoned. There is one hospital for the care and treatment of the insane.

General Sanitary Conditions.

The absence of any type of health department in the city of Canton and the presence of revolution and counter-revolution recently experienced in this city has resulted in the absence of any attempt at sanitation or public health activities. There has been no attempt at garbage removal or street-cleaning for the past three months, and sanitary conditions are most deplorable. Piles of decaying garbage may be found in the city streets at almost any point. These heaps of refuse vary in length from three to fifty yards and are mostly from three to four feet in height. They are even found banked up against backs of the houses, both residential and business, and are in a general state of decomposition. Flies are present in untold numbers. Night-soil removal, which is done by hand, was under normal condition but poorly conducted, and at present is practically nil. Housing conditions are extremely poor, and congestion is noted everywhere. Many of the business houses are found partly demolished as a result of gun-fire during the recent revolutionary disturbances.

Port Health Work.

The Chinese Maritime Customs appoints a port medical officer, the principal duties of this official being the inspection of packages of human hair and bales of gunny-bags, for which he

receives a nominal fee for each package so inspected, and the occasional issuing of a bill of health to the few vessels engaged in foreign trade which call at Canton. There is no attempt made toward the medical inspection of persons entering the port regardless of from whence they come or under what conditions they arrive. There is no medical inspection of crews or passengers, nor inspections of vessels for purposes relating to the prevention of the introduction of epidemic diseases or for the prevention of the dissemination of such diseases to other ports should such diseases exist in Canton. No attempt is made to prevent the ingress or egress of rats between vessels and shore. The same may be said of the port health work, as was stated in reference to the municipal health activities, *i.e.*, there is none. Fumigation of vessels is not done. There is no detention station for crews of infected vessels.

Plague.

As stated above, there are absolutely no records available relative to the incidence of plague in Canton. The Port Medical Officer advises, however, that considerable plague was present in Canton prior to the year 1915, frequently reaching epidemic proportions. During 1915, however, there was a severe flood, the entire city being inundated. Since that time, according to the Port Medical Officer, there has been very little plague present in Canton—never enough to be called an epidemic. From the same source, it was learned that there have been, however, probably sixty or seventy cases of plague which occurred in Canton during the past two years, with probably an equal number of cases imported from Hong-Kong during the recent outbreaks of plague in that city.

Plague Preventative Measures.

There is no rattrapping done. At the time of the inauguration of the Health Department in 1921, there was established, however, receptacles, in the form of boxes, for rats found dead on the streets or in houses. When first installed, a certain number of rats were found and thrown into these boxes and examined by a Chinese physician (Dr. Chan). No records of the results found were kept, although it was learned that some of the rats were reported as plague-infected. These boxes at present are not used for the purpose primarily intended but are filled with garbage, rubbish, etc.

Rat-proofing procedures relative to houses and godowns have never been attempted. Nothing is done to prevent the egress of rats from vessel to shore. It may be safely said that plague-preventive measures are non-existent in Canton.

Cholera.

No data available. Physicians living in the town, however, from ten to twenty years state that there has been no severe outbreak of cholera in Canton according to their knowledge during that period. Epidemics of mild character, however, have occurred during the past twenty years. There was a severe outbreak of dysentery last year (1922). The death-rate, however, was comparatively low. Nothing definite in reference to bacteriological diagnosis was done.

Smallpox.

Smallpox is practically always present, being more marked in the spring. There is a considerable epidemic ot this disease at the time ot the present writing in Canton (March 1923). Vaccination is not compulsory and is rarely performed.

Influenza.

The city escaped the ravages of the pandemic of influenza in 1918. A limited number of cases only occurred, according to unofficial reports of local physicians.

Cerebro-Spinal Meningitis.

According to local physicians, the community was not visited by the outbreak of meningitis which occurred in Hong-Kong in 1918. Occasional sporadic cases, however, do occur.

Resumé.

A city of 769,749 (sometimes more, sometimes less, depending on political condition) with an annual interchange of over one million persons each way between it and Hong-Kong with :

(1) no Health Department nor any records of occurring diseases;
(2) no organisation of any type for the enforcement of sanitary measures, nor for the control of any epidemics that may occur;
(3) no sewers nor any organisation for systematic removal of night-soil;
(4) no scavenging of city;
(5) practically only raw river-water for drinking purposes for entire population;
(6) no port health organisation;

(7) no medical supervision over immigration nor inspection of any persons arriving in the port;

(8) no detention station for crews of infected vessels, nor any isolation hospital for communicable diseases;

(9) no attempt at rat examination nor control;

(10) no attempt to prevent the introduction of epidemic diseases into, nor dissemination of such diseases, from the port.

Summary.

Canton may be considered a potential source of infection for Hong-Kong or any other city holding commercial relations therewith.

THE FOREIGN CONCESSION OF SHAMEEN

Adjoining Canton but separated from it by a narrow creek probably fifty yards wide is the foreign concession of Shameen. This foreign concession is situated on a small island about three-fourths of a mile long, having an average width of 500 yards; of this area three-fifths is British and two-fifths French.

Population (1922) :

Non-Chinese	504
Chinese	1,197
TOTAL	1,701

The administration of the foreign concession is under the Shameen Municipal Council, composed of a chairman and seven members. There is a medical officer of health for the concession, who is not a member of the Council. There is a well-organised police department consisting of a chief inspector and 37 subordinates (sergeants, constables, etc.). The members of the police force act as sanitary officers for the concession.

Water Supply.

The foreign concession controls and operates its own water-supply, the source being from the Si Kiang River. An adequate filtration plant is in operation. The water is filtered by the Candy process and is also chlorinated after filtration. Bacteriological control shows the water to be safe. Owing to the limited storage capacity, however, the water-supply for Shameen is somewhat intermittent due to the compulsory stoppages for daily cleaning of the filters, flushing and painting of storage tanks, low tides in winter, etc. The Council recommends that all houses be provided with a tank or tanks of sufficient capacity to contain a supply of water equivalent to two days consumption during the summer months.

The estimated output of the filtered water for 1922 was 43,940,896 gallons, of which 29,245,414 was by meter service to residences and business offices, making an average consumption of approximately 470 gallons *per capita* per day—a figure which appears rather high. The estimated cost for the operation of the water-works is approximately $ 6,500 (Hong-Kong currency). The charges for water supplied to inhabitants is at the rate of sixty cents per 1,000 gallons, the rental for meters varying from three to five dollars, depending on capacity. As a result of these charges, the revenues derived from the sale of water, rental of meters, etc., is approximately $ 15,600 (Hong-Kong currency).

Sewerage.

The concession is well sewered, all sewage being treated in two septic tanks, connected up with the public sewers, before discharge into the river. There is a small amount of night-soil removal by hand in certain unsewered districts, the total cost of the procedure, however, being only about $ 240 per annum. Generally speaking, the sanitary conditions in the foreign concession may be said to be good. The concession is practically entirely residential. There are municipal recreation grounds, consisting of tennis courts, playgrounds, etc., which are maintained in good condition. There are no hospitals in the concession, but arrangements have been made by the Municipal Council for the maintenance of two beds for foreigners in the Canton Hospital. Both the rooms and the nursing service for such foreigners are maintained by the Municipal Council at a cost of approximately $ 3,500 a year. There is systematic scavenging of the concession.

General Health Conditions in Shameen.

The health of the general population of Shameen is reported to be good; gastro-intestinal disturbances of various forms, during the hot months especially, have been the principal cause of illness.

Typhoid Fever.

There were two cases of typhoid fever during 1922, neither of which was fatal.

Dysentery.

The number of cases of dysentery is almost constant each year. The amœbic form is the variety reported as found in almost every instance.

Pneumonia.

Four cases of pneumonia occurred in 1922, one of which was fatal.

Malaria.

According to the report of the Medical Officer of Health at Shameen, anopheles mosquitoes do not occur in Shameen (?). Admission is made, however, that they occur in the surrounding territory at Pak Hok Tung, Fong Thuen and Taikoo wharf. Malaria, however, is constantly occurring in Shameen.

Influenza.

Sporadic cases are always occurring, but there was no epidemic during the pandemic of 1918.

While the general conditions in Shameen, relative to health matters and sanitation, may be said to be good, the close proximity of the Chinese city of Canton to the concession and the constant interchange of population between the two communities, while officially restricted to the minimum degree possible by the placing of police guards at the bridge entrance of the concession, cannot fail to be a potential source of danger in reference to epidemic diseases. The interchange of population between the two communities, however, owing to the fact that access may be had to Shameen only by one bridge, at the entrance of which guards are placed to prevent the general population of Canton having access to the concession, is not as extensive as in most foreign concessions located at other treaty ports.

X — SHANGHAI

Shanghai is situated on the Whangpoo River, some 14 miles above the confluence of this river with the Yangtze, 31° 15′ N. in longitude 121° 19′ E.

The International Settlement is administered by the Shanghai Municipal Council. The French Settlement, which lies immediately to the south of the International Settlement, has an independent administration. Shanghai City, which is in independent Chinese territory, adjoins the French Settlement.

The total area administered by the Municipal Council is 5,584 acres, in which the population, estimated on December 31st, 1922, amounts to 840,000. Of this number, 814,000 are Chinese, 26,000 only being foreigners. The density of the population over the whole of the municipal area thus amounts to 149 persons per acre; in the crowded areas it is enormously greater than this.

Chinese territory surrounds the municipal area on the north, east, and west. On the south is the French Settlement, which lies immediately to the north of the Chinese city of Shanghai.

The Shanghai harbour consists of some nine miles of the Whangpoo River which is navigable to ships of large draught. Wharves and docks line both sides of the river. In addition there is an extensive anchorage, including the quarantine anchorage, at Woosung, in the Yangtze, opposite the mouth of the Whangpoo.

The climate of Shanghai is characterised by very considerable variation in temperature. Frost and snow are experienced during the winter months. In July and August mean temperatures in excess of 80° F. are the rule. Below are given in tabular form the mean temperature, relative humidity and rainfall for each month of the year :

Months	Mean Temperature (° Fahr.)	Daily Range of Temp. (° Fahr.)	Relative Humidity per cent	Rainfall in inches
January	38.14	11.74	77.8	2.86
February	42.88	14.90	84.8	3.57
March	47.80	18.02	75.5	2.05
April	58.44	18.40	78.6	2.04
May	66.02	16.10	82.1	4.03
June	75.12	17.82	80.4	9.09
July	80.96	17.36	82.3	2.75
August	82.14	16.22	82.0	5.27
September	73.85	14.22	85.3	11.13
October	63.80	18.70	80.1	2.26
November	50.96	21.38	69.3	0.46
December	40.64	20.82	68.8	0.15

The Health Department of the Shanghai Municipal Council is in charge of a Commissioner of Public Health, a British medical officer with long experience of the East. There are in addition one deputy and one assistant commissioner of public health, three pathologists, three analysts and pharmacist all with adequate clerical and laboratory staffs. There are four chief sanitary inspectors and 20 sanitary inspectors, all Europeans. An adequate staff of nurses and attendants for the various municipal hospitals and institutions completes the personnel of the Health Department of the Municipal Council.

The population of the municipal area is a fluctuating one; males are in excess of females in the proportion of 3 to 2. There is constant communication between the population of the foreign settlements and of the surrounding Chinese territory, in which there is nothing at all in the shape of modern public health administration. Very densely populated areas in the foreign settlement run into very densely populated and deplorably insanitary and unsavoury areas on the Chinese side of the boundary-line. Thus, when one speaks of disease and death statistics and sanitary conditions generally in the municipal area of Shanghai and in the French Settlement, one is, in fact, talking of conditions in a portion of a considerably larger town, a town having an aggregate population of some two millions.

If these facts be borne in mind, it will be appreciated that any attempt of the Public Health Department of the Shanghai Municipal Council to prevent the spread of disease to or from the area under their jurisdiction is fraught with immense difficulty and that the threat of epidemic disease from China is ever present.

Neither the notification of communicable diseases nor the notification of deaths is legally compulsory in Shanghai, and there is no birth registration enforced among the Chinese population. Qualified medical practitioners of Shanghai, however, are paid a fee for the notification of communicable diseases, and the services of the Public Health Laboratory for the diagnosis of these diseases are at the disposal of such practitioners in return for such notifications. In this way a small proportion of the cases of communicable disease that occur within the municipal area are notified to the Public Health Department.

With regard to registration of deaths among the Chinese, each house in the International Settlement is visited each day by a refuse coolie, who reports all deaths to the sanitary inspector in charge of the sub-district concerned. The latter official then institutes inquiries as to the

duration of sickness, symptoms, etc. and thus arrives at an approximate diagnosis of the cause of death. The number of deaths certified by qualified medical practitioners form but a small proportion of the whole. It is considered that only a small percentage of the deaths that occur in Shanghai escape record, certainly not more than 15 per cent, probably considerably less. Though this be so, the death-rates based on recorded mortality are far from affording an accurate index of public health conditions among the Chinese population of the Settlement. When Chinese suffer from chronic or incurable complaints, it is by no means uncommon for them to leave the Settlement for their native villages, there to await death. It is probable, then, that the deaths recorded in Shanghai are chiefly those attributable to acute diseases, accidents and the like.

Below are given in tabular fom the death-rates for each year since 1910 of the foreign resident population and of the Chinese resident population respectively :

Year	Death-rate of Foreign Resident Population	Death-rate of Chinese Resident Population
1910	20.2	17.5
1911	15.9	13.8
1912	18.9	19.3
1913	18.6	15.8
1914	18.0	16.2
1915	15.4	13.2
1916	14.0	13.0
1917	20.7	14.9
1918	16.5	12.8
1919	20.6	14.3
1920	15.2	11.2
1921	18.2	11.0
1922	19.3	11.7

From the above table it will be seen that there has been an appreciable decline in the reported Chinese death-rate, which was as low as 11.2, 11.0 and 11.7 in the three years 1920-22, rates very much lower than those of the foreign population for these three years. Bearing in mind the conditions in which the Chinese population live in the more crowded parts of the town, these death-rates are incredibly low, a fact which is explicable by considerations referred to above. Corroboration of this contention is afforded by a study of the morbidity and mortality returns of the Shanghai Gaol. The annual gaol mortality rate is generally in the neighbourhood of 60 per 1,000. Nearly three-quarters of the deaths in gaol are attributable to tuberculosis. Prolonged observations have shown that 65 per cent of long-sentence prisoners admitted into the gaol have signs of tuberculosis on admission. This figure is sufficient to indicate the terrible prevalence of this disease among the resident Chinese community, though, of course, the prison population is recruited chiefly from the very lowest strata of the social scale.

Whereas three-quarters of the gaol deaths are caused by tuberculosis, this disease is responsible for only some 10 per cent of the recorded mortality among the free Chinese population. The assumption that sufferers from this disease, in acute form, leave the Settlement to die elsewhere thus finds abundant support.

During 1922, the reported Chinese deaths in the Settlement numbered 9,517, as compared with 8,610 in 1921. The causes to which some of these deaths were ascribed are set out in the following table :

Month	Smallpox	Cholera	Diphtheria	Scarlet Fever	Cerebro-spinal Fever	Tuberculosis	Influenza	Beri-Beri	Measles
January	150	0	10	21	0	58	25	4	32
February	56	0	9	25	0	77	14	0	30
March	16	0	6	22	0	70	20	0	42
April	6	0	13	19	3	73	17	1	52
May	2	0	10	28	1	80	11	2	30
June	0	0	0	16	3	72	5	0	19
July	0	35	0	7	0	97	0	1	5
August	0	44	0	0	1	86	2	6	0
September	0	20	1	5	0	66	0	3	0
October	0	1	2	3	0	63	0	4	0
November	0	0	0	2	0	55	0	2	1
December	0	0	2	1	0	73	4	0	1
TOTAL	230	100	53	149	8	870	98	23	212

The notification of infectious disease is too imperfect to warrant discussion of the number of cases reported from year to year. With regard to deaths, however, the figures in the above table indicating the deaths caused by acute communicable diseases are an approximately accurate index of disease prevalence. From what has been said already, it will be understood that this remark certainly does not apply to tuberculosis and beri-beri.

Taking all the circumstances into consideration, it seems unlikely that an acute epidemic causing appreciably increased mortality could prevail undetected in the International Settlement of Shanghai.

Before considering the three diseases plague, cholera and smallpox, which are of chief importance from the point of view of the present inquiry, the prevalence of certain other diseases in Shanghai calls for passing remark.

Influenza.

It is noteworthy that Shanghai, in common with other parts of China and with Hong-Kong, suffered very little from influenza during the severe pandemic of 1918. As a matter of fact, the death-rates from all causes for both the foreign and Chinese populations of Shanghai for 1918 were less than those of the succeeding and preceding years. The deaths attributed to influenza during the last five years are as follows :

Year	Deaths among Foreigners	Deaths among Chinese
1918	11	418
1919	38	483
1920	10	160
1921	4	76
1922	6	98

This immunity from the severe epidemic of influenza is especially noteworthy in view of the conditions in which a large proportion of the population lives, conditions eminently favourable to the propagation of the disease.

Cerebro-spinal Fever.

The relatively severe outbreak of cerebro-spinal fever in Hong-Kong in 1918 and following years has had no counterpart in Shanghai. Cases have occurred, but they have all been sporadic in nature.

Scarlet Fever.

Scarlet fever is a relatively common disease among the Chinese population of Shanghai. Moreover, it prevails in a very acute form, with a high case mortality rate.

Typhus and Relapsing Fevers.

Cases of typhus fever occur from time to time, but the disease is not endemic in Shanghai. This is all the more noteworthy in view of the fact that relapsing fever cases are by no means uncommon. Relapsing fever is of a mild type and there is no mortality, at any rate among the cases treated in hospitals.

Forty-eight Chinese suffering from relapsing fever were admitted into hospital during 1922. Typhus fever was responsible for only one admission.

Typhoid and Paratyphoid Fevers.

Diseases of this group are common in Shanghai. During 1922 they were responsible for 33 deaths among the foreign resident population, all but one occurring among the Japanese community.

Typhoid fever appears to be more common than paratyphoid. Among the Chinese, paratyphoid A appears to be more common than paratyphoid B while the reverse holds good for foreigners. During 1922, cases investigated by the Public Health Laboratory were as follows :

	Chinese	Other Asiatics	Other Foreigners
Typhoid	67	11	121
Paratyphoid A	14	1	12
Paratyphoid B	8	4	25

It is interesting to recall that in the warmer countries of the East, notably in British India, paratyphoid B is a very rare disease in comparison with paratyphoid A.

Dysentery.

Dysentery is not uncommon. The bacillary form of the disease is most in evidence; acute amœbic dysentery appears to be much less in evidence than it was some ten years ago. Liver abcess is rare, whereas a decade ago it was quite common.

Plague.

Plague infection among the rats of Shanghai was first noted towards the end of 1908, and the disease persisted among the rats till 1915, since when only two infected rats have been found, namely in 1920. As a human disease, bubonic plague has been very little in evidence, and no

outbreak of pneumonic plague has ever been reported. These facts are summarised in the following table :

	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Plague-infected rats . .	49	187	249	138	95	122	186	76	6	0	0	0	2	0	0
Human plague Cases . .	0	0	6	0	18	10	26	1	0	0	0	0	0	0	0

It will be noted that Shanghai has been absolutely free from human plague for seven years, and, with the exception of the two rats found in 1920 in the neighbourhood of wharves, there has been no evidence of rat plague during the last six years, in spite of continuous rat examination.

The behaviour of plague in Shanghai has been most unusual, and the explanation of this unusual behaviour is not obvious. Once again we see the incidence of human plague failing to be an index of the intensity of the rat epizootic. In other Oriental ports where a similar phenomenon has been observed, a possible explanation seemed to lie in the fact that *decumanus*, the Norwegian rat, is more prevalent than *Rattus rattus*. *Decumanus* does not live in such close contact with human beings as does *rattus*. In Shanghai, however, *Rattus rattus* is by far the most common species, and is apparently three times as prevalent as *decumanus*.

Taking into consideration the manner in which the rats for examination were obtained, the figures in the above table indicating the number of plague-infected rats found during the years 1908-1915 are evidence of a very severe and very widespread epizootic. The intensity of this epizootic was greatest in the northern crowded and most insanitary section of the Settlement, where one would have imagined all the facilities exist for the successful transference of infection from rat to man.

Very few observations have been made regarding the species and number of fleas infesting the rats of Shanghai. Detailed information regarding these matters would be of much more than academic interest (1). It would probably throw light on this important and interesting problem.

The experience of the years 1908-1915 was sufficient to indicate that rat plague finds no difficulty in surviving adverse climatic and other conditions in Shanghai. The freedom from rat plague of the last six or seven years is thus all the more remarkable. In view of the experience of other plague-infected towns in the East, it cannot be seriously contended that the anti-plague measures adopted by the Public Health Department, admirable as these were in many respects, were alone sufficient to eradicate the disease. The so-called rat-proofing of houses that was carried out on an extensive scale consisted chiefly in the abolition of ceilings and in filling up the spaces that formerly existed between the wooden floors and the ground with material impermeable to rats. These spaces under the floors were formerly, and are still where they exist, admirably suited for sheltering rats. Excellent work was also done in the direction of improved scavenging and providing closed rat-proof refuse receptacles, thus diminishing the rats' food rupply. Even in the improved parts of the town, however, there is still shelter and food for rats in abundance, and rats are still very prevalent. Moreover, the absence of plague from the Chinese city of Shanghai cannot be attributed to anti-plague measures, none having been enforced.

The Public Health Department very wisely persists in its anti-plague measures in spite of the last seven years freedom from plague. It fully appreciates the fact that, once plague gains a foothold among the rat population of a town of this size, most heroic and expensive measures may be necessary for its eradication. During the year 1922, 19,742 rats were found and brought to the laboratory for examination; none were found to be plague-infected. In addition 4,700 traps, mostly of the spring break-back variety, were in constant use, and 74,759 rats were trapped and burnt. One thousand one hundred and ten houses were "rat-proofed" in the manner described above.

Further reference to plague prevention will be found in that section of this chapter which deals with quarantine port health procedure.

Cholera.

Cholera is a disease of frequent occurrence in Shanghai, though it is doubtful whether it can be considered as endemic. The winter months are nearly always free from the disease, but in the summer months it is the rule, rather than the exception, for cholera to appear in either epidemic or sporadic form.

In 1922 the disease made its appearance towards the end of June. Among the foreign population 23 cases occurred in which the diagnosis was confirmed bacteriologically. In the Chinese Isolation Hospital, 31 cases were treated, of whom six died. In addition to this Isolation Hospital, two special hospitals were opened during the summer months, in which 624 patients, coming from the Settlement area, were treated; only 87 of these patients died, a case mortality rate of 14 per cent. In the majority of these cases the diagnosis was not confirmed bacteriologically.

The report from the Public Health Laboratory of Shanghai for 1922 states that altogether specimens were received from 299 patients, and that the diagnosis of cholera was confirmed in 268. All cases in the municipal hospital are detained until bacteriological examination of the excreta

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(1) Since the above was written the examination of rat-fleas has been commenced. Of 382 fleas examined in March 1923, 266 belonged to the genus *Ceratophyllus*, 114 to the genus *Ctenopsylla* and only two to *Xenopsylla*, one on a *Rattus rattus* and one on a *decumanus*. The "flea count" on 98 *rattus* was 2.79 and on 31 *decumanus* 3.48 per rat. One is justified in assuming that the species of fleas of the above genera present in Shanghai do not bite man with the readiness displayed by *X. cheopis* in like circumstances.

fails to demonstrate the cholera vibrio. One patient continued to excrete vibrios for four weeks after recovery from the acute attack. In a few cases non-agglutinable vibrios were found.

Anti-cholera vaccination is practised on an insignificant scale; locally-prepared vaccine is always available for use.

Below is given in tabular form the number of deaths attributed to cholera during each of the past eleven years :

Year	Foreign Residents	Chinese Residents
1912	14	1,307
1913	0	0
1914	0	350
1915	0	0
1916	0	100
1917	0	0
1918	0	0
1919	32	648
1920	2	142
1921	3	119
1922	1	100

Ninety-nine out of the hundred Chinese cholera deaths reported in 1922 occurred in the three months July to September.

Smallpox.

Smallpox is very prevalent in Shanghai as in most other parts of China, though three years during the last decade, 1916, 1919 and 1920, were practically free from this disease. Below is set out the number of deaths attributed to smallpox during each of the past eleven years among the non-Chinese and the Chinese resident population respectively :

Year	Foreign Residents (Non-Chinese)	Chinese Residents
1912	3	124
1913	12	207
1914	11	162
1915	15	106
1916	0	3
1917	18	188
1918	4	107
1919	1	0
1920	0	0
1921	23	204
1922	10	230

Smallpox in Shanghai is a disease of the winter months. Of the 230 Chinese deaths reported in 1922, 206 occurred in the months of January and February.

Smallpox is not so severe a disease among the Chinese as it is in Europe, and the case mortality rate is comparatively low.

On the whole there appears to be some evidence that the incidence of smallpox in Shanghai is on the decline. The Chinese are not averse to vaccination, and the number of vaccinations performed during recent years is encouraging. During the years 1921-1922, more than 66,000 free vaccinations were performed by the Public Health Department. It is estimated that 70 per cent of the children under five years of age have been vaccinated.

Public free vaccinations are performed at each of the 15 branch health offices.

Hospital, Laboratory, etc.

The Public Health Department of the Shanghai Municipal Council is in possession of new admirable pathological and chemical laboratories, adequately staffed and equipped, in which a large amount of routine work and some valuable research are carried on. The services of the bacteriological laboratory are at the disposal of the Port Health Authority in case of need. Sections of the laboratory are devoted to the manufacture of vaccines of all kinds, and to the Pasteur prophylactic treatment of rabies.

The infectious disease hospital accommodation provided by the Public Health Department appears to be adequate to present needs; the hospitals are well equipped and very well administered. The total epidemic hospital accommodation is just short of 500 beds. Patients suffering from infections of the typhoid group are treated in the Victoria Nursing Home, a municipal hospital, and the General Hospital.

Water Supply.

The only available source for the water supply of Shanghai is the River Whangpoo. The intake is below the town. The water is passed through slow-sand filters and subsequently chlorinated. The final product is safe, but a water supply derived from a tidal river full of shipping of all kinds can hardly be termed satisfactory. It is obviously constantly liable to gross

contamination and any temporary breakdown in the system of purification, or negligence on the part of the staff, might be attended with dire results. At the present time bacteriological examination of the treated water is made daily. After periods of long drought, such as had been experienced immediately prior to our visit, the saline content of the water is apt to be higher than is desirable in a supply used for drinking purposes. It must be confessed that the noteworthy absence of severe water-borne epidemics is testimony to the adequacy of the methods employed for water purification.

Drainage, etc.

Only a few parts of the town have a water-carriage system of drainage. The difficulties attendant upon any considerable expansion of the water-carriage system are sufficiently obvious. (It would be obviously objectionable to discharge an untreated effluent into a tidal river which is the sole source of the water supply.) Such water-carriage installations as exist are for the most part connected with cesspools, which are emptied periodically; there are also a few septic tank installations.

A considerable extension of the water-carriage system of drainage is shortly to take place. It is proposed to treat the sewage by the activated sludge method; an experimental plant has been in operation for some time and is giving admirable results.

Throughout the native city and over by far the greater part of the Foreign Settlement, hand removal of night, soil is the method employed.

The system of surface drains appears to function well, and adequate attention is paid to scavenging and refuse removal generally.

Port Health Procedure, Quarantine Regulations, etc.

All port medical and sanitary work in Shanghai is carried out under the control of the Commissioner of Customs. Regulations are agreed upon and sanctioned by the Commissioner of Customs in agreement with the Treaty Power consuls at the port.

There is one Port Health Officer, who lives at Woosung, 12 miles below Shanghai on the left bank of the Whangpoo at its junction with the Yangtze. The quarantine anchorage is in the Yangtze nearby. On the right bank of the Whangpoo, opposite Woosung, is situated the quarantine station. Silting up of the river has made approach to the station somewhat difficult. The station has accommodation for some 200 persons; in case of need, additional accommodation could be provided in tents or huts, for which there is ample space. The station is divided into two parts, one for Chinese and one for foreigners, and consists of a number of small buildings. There are two steam disinfecting machines and sufficient bathing accommodation. The Chinese portion of the station is administered by the Chinese Red Cross Society and is in the care of a resident Chinese medical officer. The Port Health Officer exercises supervision over the whole station.

The quarantine regulations of Shanghai take cognisance of the following diseases: plague, cholera, typhus fever, yellow fever, smallpox, and scarlet fever. Ports are declared infected when the average daily number of cases of any of the above diseases amounts to three in any one week. Ports are declared infected by the Commissioner of Customs in agreement with the Treaty Power consuls.

An infected vessel is one which has on board, or has had within a period of 10 days prior to her arrival, a case of any of the above diseases. A suspected vessel is one which has been at an infected port within a period not exceeding 10 days of her arrival in Woosung, or a vessel on board which a death has occurred during the voyage from her last port of call. Infected and suspected vessels anchor at the quarantine anchorage and are boarded by the Port Health Officer.

The fumigation of vessels is carried out in Shanghai by a private disinfecting company. Should it be impossible or undesirable to send any vessel requiring disinfection to Shanghai, the disinfecting barge could be sent to Woosung. A recently adopted regulation makes it necessary for all vessels entering the port of Shanghai to produce a certificate of fumigation not more than six months old.

The Giemsa-Nocht method of fumigation and sulphur fumigation with a Clayton apparatus are both used in Shanghai The former is the method most commonly employed. The quarantine regulations contain rules regarding the precautions to be observed by steamers undergoing fumigation with this gas.

Bills of health are issued by the Public Health Department of the Shanghai Municipal Council although this department is in no way directly concerned with port health procedure. The ordinary British Consular bill of health form is the one employed and to it is attached the most recent weekly statement regarding the incidence of communicable disease in the municipal area.

Quarantine and sanitary regulations of the port of Shanghai are at the present time undergoing revision. For this reason it would be hardly profitable to discuss them at great length in this preliminary note. There are a few points, however, to which attention might be drawn, notably with regard to plague.

Plague is undoubtedly the most important disease against which the health authorities of the port of Shanghai have to guard. Though for some years Shanghai rats have been free from infection, past experience has shown that all the factors necessary for the propagation of rat plague exist in that town. The careful observance of all precautions necessary to ensure the continued freedom of the port from infection, with due regard, of course, to commercial interests, is a matter

of great moment. Such measures are of three kinds. In the first place, the importance of keepin storehouses and godowns on the wharves, and in the harbour area generally, as free from rats a possible must be emphasised. It would probably be impossible to eliminate the rat from certai of the older storehouses and godowns without extensive structural alterations, but, in the cons deration of schemes for port extension, the possibility of erecting warehouses that can be kep rat-free should be considered. In this connection it might be well to remark that a "rat-proof building, as that term is often understood, is not necessarily a "rat-free" building. In the secon place, very strict measures to prevent ship-rats being brought ashore are essential. Finally periodic fumigation, to ensure that ships frequenting the harbour are kept as free as possible fror rats, is a very necessary procedure.

The quarantine regulations of Shanghai indicate that the importance of measures under thes two last heads has not been overlooked.

The possibility of submitting to periodic fumigation all lighters that are used for dischargin cargo from vessels at anchor in the stream, and of restricting the handling of cargo from plague infected ports to such rat-free lighters, has recently been under the consideration of the port autho rities of Shanghai. Should it be found possible to enforce such a measure, an important additiona safeguard against plague infection would thereby be secured.

The system whereby all fumigation of vessels in the port of Shanghai is carried out by a privat disinfecting company appears to work well. It would seem to be desirable, however, that thi fumigation be subject to a certain amount of supervision and control by the Port Health Autho rity, which would then be in a position to issue fumigation certificates required by the health autho rities of other ports.

It is satisfactory to note that river steamers as well as ocean going craft are subject to periodi fumigation in Shanghai.

If the Health Department of the Shanghai Municipal Council continue as heretofore to issu bills of health to outgoing steamers, it is necessary that the very closest co-operation exis between this department and the Health Authority of the port. This will be all the more necessar should the not very informing bill of health form now in use be replaced by one detailing suc information as might reasonably be demanded by the health authority at the next port of call

XI — JAPAN

Japan's extensive and ever-increasing industry and trade, the length of her coast-line, her umerous ports, her geographical position, and the extent of the maritime communications which xist between Japan and parts of the Orient where plague, cholera, smallpox and other serious ommunicable diseases are constantly recurring in epidemic form, combine to make the study : health conditions, public health organisation and administration in Japan of peculiar interest nd importance to the work of the present mission. The subject is, however, a very large one and ot amenable to satisfactory treatment within the limits imposed by the nature of this report. ide by side with the well-known and striking advance made in Japan in the sphere of scientific ıedical research work, which is justly held in the highest esteem by the medical profession ıroughout the world, there has occurred a growth and development of a modern public health dministration somewhat complex in its organisation. In the following paragraphs an attempt ⁄ill be made to describe the working of that administration sufficiently fully as to permit of an nderstanding of the measures taken to combat epidemic diseases in Japan, and an appreciation f the significance of vital statistics and morbidity returns issued by the health authorities of that ountry.

In this section of the report reference will be made only to Japan proper, which is subdivided ıto 47 prefectures; Formosa and Korea are treated separately.

Central Health Organisation.

The Home Department of the Imperial Government in Tokyo is responsible for the discharge f most of the public health activities of the Empire. The War Office, the Admiralty, and the ducation Department have also public health functions to perform, each within its respective phere. Industrial hygiene, which formerly belonged to another department, is now dealt with n the Home Department.

The section of the Home Department entrusted with the care of the public health is termed he Central Sanitary Bureau and is under the charge of a non-medical president. The bureau s divided into five sections :

(1) "A Public Health Section". This section is concerned with sanitary engineering subjects vater supplies, drainage schemes, and the like; foodstuffs; health resorts; infant welfare; and everal miscellaneous activities which can be grouped together under the heading "Public Hygiene".

(2) A section entrusted with the prevention of chronic infectious disease such as tuberulosis, venereal disease, leprosy, trachoma, and parasitic diseases such as ankylostomiasis. Menal diseases also come within the cognisance of this section.

(3) A section concerned with the prevention of acute epidemic disease. To this section is ntrusted the supervision of port health work and quarantine procedure, and the manufacture, tandardisation and distribution of sera, vaccines, etc.

(4) A medical section which is concerned with all matters relating to medical practitioners, lentists, midwives, nurses, chemists, medical associations, drugs and patent medicines, and general ıospitals.

(5) An investigation section responsible for the prosecution of inquiries regarding important questions of hygiene; vital statistics, and public health propaganda work.

Certain central laboratories are also under the direct control of the Minister for Home Affairs, The most important of these, from the point of view of the present inquiry, is the Central Infecious Diseases Investigation Institute in Tokyo. This well-equipped and well-administered nstitute carries out investigation into the etiology, prevention, and treatment of communicable liseases, as well as the manufacture of vaccines and sera of all kinds. In short, it undertakes all the functions of a central epidemiological institute.

The Kitasato Institute of Preventive Medicine undertakes exactly similar functions; it is ıot, however, a Government institution, though it renders most valuable services to the State. The excellent work that has been done in the Tokyo institutes and laboratories is so well known that well- deserved encomiums of their distinguished staffs, installation and Equipment would be completely redundant in a report of this nature.

Attached to and under the control of the Home Minister there is a Central Board of Health. This is an advisory committee, composed of a chairman and not more than thirty members selected either by reason of their scientific attainments or on account of the positions which they occupy in the administration. This board expresses its opinion on any matters connected with the public health which may be referred to it by competent ministers of State, and may also make representations to such ministers regarding matters which, in its opinion, call for consideration or action.

There is also a council or standing committee for the Japanese Pharmacopœia, and a counci of "health preservation and hygiene". These two councils are also under the control of th Minister for Home Affairs.

Attached to the Central Sanitary Bureau of the Home Department there is a staff of eleve experts and seven assistant experts, who are employed in giving advice and rendering assistanc to local administrations in the control of outbreaks of epidemic diseases.

The port health administrations are under the direct control of the Central Government There are six permanent port health offices at Kobe (Hyogo Prefecture), Yokohama (Kanagawa Prefecture), Nagasaki (Nagasaki Prefecture), Moji (Fukuoka Prefecture), Osaka (Osaka Prefec ture) and Tsuruga (Fukui Prefecture). There are also at present five additional temporary por health offices and quarantine stations at Karatsu (Saga Prefecture), Hakodate (Hokkaido Pre fecture), Kagoshima (Kagoshima Prefecture), Yokkaichi (Miye Prefecture), and Nagoya (Aich Prefecture). At all the above ports vessels arriving from foreign ports and from Formosa, Korea and Manchuria are inspected, and all imported animals are examined.

Provincial Health Organisation.

The provincial sanitary administration is in the charge of the local police departments, unde the direction and general control of the governors of the prefectures. In each of the 47 prefec tures there is a chief sanitary officer, appointed by the local governor, who works with and throug the police authorities. In cities and towns possessing municipalities, the municipal health offi cers and officials are appointed by the municipality.

Registration of Vital Statistics and Notification of Infectious Diseases.

It is doubtful whether there is any country in which the registration of births and deaths is carried out with greater accuracy than it is in Japan. In towns and villages alike, all houses are subjected to frequent and regular visits by police officials, who keep a careful record, not only of the number and age of all inmates of each house, but also of such matters as vaccination, schoo attendance, occupation and the like. In this way it would be almost impossible for either a birth or death to go unrecorded. The registration of births and deaths is, of course, compulsory.

Similarly the occurrence of cases of infectious disease is little likely to escape observation Here it may be remarked that the number of qualified medical practitioners in Japan is very large, equivalent to one practitioner for every 1,250 of the population of the country. Though the distribution of these medical practitioners is, of course, by no means uniform, there are few, i any, parts of the country in which sufficient skilled medical attendance is not available.

Prevention of Infectious Disease.

Under the law for the prevention of infectious diseases (1897—amended 1905, 1911, 1918 and 1922), the following infectious diseases are notifiable :—Cholera, dysentery, typhoid fever scarlet fever, smallpox, typhus fever, diphtheria, plague, paratyphoid fever, and epidemic cerebro-spinal meningitis.

The Minister in charge of the Home Department is authorised to add further diseases to this list should occasion arise.

Extensive powers are given to the governors of prefectures in the matter of dealing with outbreaks of infectious disease. All vessels and railway trains may be subject to medical inspec tion. Houses in which cases of infectious disease have occurred, or which are suspected to be infected, are closed for a definite period, disinfected and cleansed. In the event of plague, specia orders for the destruction of rats are issued. Bodies of persons dead of an infectious disease mus be cremated; they can be buried only with special permission. Expenses incurred by town o village authorities in combating infectious disease may be reimbursed by the prefecture to the extent of one-sixth of such expenditure (one-third in the case of cholera and plague), and the anti-epidemic expenditure of the prefectures may be reimbursed in like proportion by the centra administration.

Water Supplies, Sewage Disposal, etc.

Speaking generally, water supplies in Japan appear to be satisfactory. Considerable attentior is paid by local authorities to the provision of a pure and plentiful water supply. The purifi cation of urban supplies is most frequently carried out by slow-sand filters, but there are also a few admirable mechanical filtration plants.

Much less progress has been made with regard to modern sewage disposal works. Increasing attention is now being paid to this matter, but, in comparison with the advance made by Japar in other sanitary matters, even the larger towns must be considered backward in this respect.

In all villages and in most of the cities and towns, hand-removal of night-soil is still practised The country is intensively cultivated, as indeed it must be if it is to support its very large and ever-growing population, and human excreta are valued for their manurial properties. That the

›plication of untreated human excrement to the soil is responsible for the high incidence of cer- in diseases cannot be gainsaid, but, in the conditions prevailing, the difficulties attendant upon ıy large development of modern methods of sewage disposal are very considerable.

Births and Deaths.

The birth rate of Japan is high—very high when compared with that of most European ›untries. During the last decade, the annual birth-rate has, year after year, approximated 3 per 1,000 inhabitants. There are approximately 104.25 male births for every 100 female—normal proportion.

The annual death rate has for very many years past fluctuated round about 20 per mille. he mean quinquennial death-rates for the six five-year periods between 1886 and 1915 were as ›llows : 20.6, 21.1, 20.6, 20.5, 20.9, 20.0. The highest annual death-rate experienced during ›cent years was that of 1918, when a death-rate of 26.8 was recorded; this increased mortality ›as caused by the influenza pandemic. A study of the death-rates for many years past seems to ıow that epidemics of sufficient intensity to cause a marked increase in the total death rate of ıe country as a whole are rarely experienced in Japan.

Infectious Diseases.

Typhoid Fever and Dysentery.

Of all infectious diseases, typhoid fever, diphtheria, and dysentery are of most serious impor- ınce in Japan. During the last twenty years of the last century, dysentery was much more ı evidence than was typhoid fever, and was responsible for a much higher death-rate. During the rst ten years of the present century, however, the incidence of these two diseases tended to qualise, the incidence of typhoid fever remaining more or less stationary, while that of dysentery ›eadily declined. During the last decade, typhoid fever has been much more prevalent than has ysentery. The incidence of typhoid fever has increased appreciably, while dysentery preva- ›nce has exhibited a still more marked diminution. Below are given in tabular form the cases nd deaths attributable to these two diseases for each year from 1910 to 1922 :

	Typhoid Fever		Dysentery	
	Cases	Deaths	Cases	Deaths
1910.	35,387	7,585	31,960	7,053
1911.	34,138	6,830	27,464	6,009
1912.	31,528	6,289	25,667	5,721
1913.	27,717	5,443	16,779	3,691
1914.	35,471	6,626	26,127	5,718
1915.	36,460	7,137	21,137	4,368
1916.	41,918	8,396	22,452	4,554
1917.	35,199	7,254	14,942	3,160
1918.	43,151	9,873	13,998	2,823
1919.	54,706	11,156	12,915	2,920
1920.	53,925	10,327	12,738	2,961
1921.	49,955	10,624	12,445	2,941
1922.	52,381	11,080	14,899	3,831

Compared with typhoid fever, the paratyphoid fevers are but little in evidence. The cases nd deaths ascribed to paratyphoid fever during the last five years are as follows :

	Paratyphoid Fever	
	Cases	Deaths
1918.	5,794	747
1919.	7,435	836
1920.	7,726	858
1921.	6,290	802
1922.	7,150	852

Before leaving the subject of these three diseases, it may be of interest to remark that ›aratyphoid B is the type of disease most commonly seen, as in Europe. Paratyphoid A, so ›ommon in British India, Formosa, and in other tropical parts of the East, is a very rare disease in Japan.

It is difficult to suggest an explanation for the noteworthy decrease in the incidence of dysentery during a period in which the incidence of typhoid fever has shown a tendency to increase. It is interesting to note that the Shiga type of dysentery, formerly common, is now relatively rare, and that the Flexner type of bacillus, formerly little in evidence, is now comparatively common. Amœbic dysentery is very rarely seen in Japan proper. The months July to October are the months of maximum incidence of all three diseases; dysentery is a relatively rare disease during the first five months of the year.

Diphtheria.

The incidence of diphtheria has decreased somewhat of recent years. Below is given in tabula form the number of cases and deaths attributed to diphtheria during the last ten years :

	Diphtheria	
	Cases	Deaths
1913	19,137	5,011
1914	18,343	4,580
1915	19,701	4,709
1916	14,249	3,960
1917	17,487	4,375
1918	15,748	3,849
1919	14,280	3,343
1920	15,173	3,439
1921	14,522	3,501
1922	13,969	3,251

Scarlet Fever.

Scarlet fever appears to have been a very rare disease in Japan before the beginning of the present century, but its incidence has shown a marked tendency to increase during recent years it is of a mild type. In 1922 there were 1,655 cases of scarlet fever, with 96 deaths.

Typhus Fever.

Outbreaks of typhus fever are not uncommon in Japan. The first ten years of the present century, however, were relatively free from the disease, since when there has been a somewhat greater prevalence. An outbreak of considerable severity was experienced in 1914, when 7,309 cases were reported, of which 1234 cases proved fatal, a high case mortality rate. More than half these cases occurred in the Tokyo prefecture. March to June inclusive were the months of maximum prevalence. The cases and deaths attributed to typhus fever during each year from 1910 to 1922 are given in the following table :

	Typhus Fever	
	Cases	Deaths
1910	5	4
1911	3	3
1912	1	1
1913	0	0
1914	7,309	1,234
1915	499	64
1916	606	117
1917	219	28
1918	229	28
1919	225	30
1920	66	3
1921	171	22
1922	23	5

Cerebro-Spinal Meningitis.

Cerebro-spinal meningitis made its appearence in epidemic form in 1918, when it was made a notifiable disease; this was the year of the severe outbreak in Hong-Kong and adjacent parts of China. The cases and deaths for which this disease has been responsible during the past five years are as follows :

	Cerebro-spinal Meningitis	
	Cases	Deaths
1918	1,054	636
1919	2,458	1,261
1920	944	493
1921	772	412
1922	933	531

It will be noted that 1919 was the year of maximum prevalence, when no less than 2,458 cases were reported. The disease has been most in evidence in the large towns Tokyo, Osaka, and Kyoto.

Influenza.

Japan suffered severely from the pandemic of 1918-1919. This fact is of interest when the relative immunity which parts of China nearest to Japan enjoyed is recalled. Between August 1st, 1918, and January 15th, 1919, no less than 204,730 deaths were attributed to influenza, equivalent

) a death-rate of 3.6 per 1,000 of the population. For the four succeeding years, the influenza eath-rates amounted to 1.02, 2.16, 0.21, and 0.14 per 1,000 respectively. In all these years the ot summer months have been almost completely free from the disease.

Plague.

Plague infection has been frequently introduced in Japan during the last 26 years, but, though : has frequently given rise to some anxiety and has entailed the expenditure of large sums of ıoney on preventive measures, no severe human epidemic has ever been experienced. In the)llowing table the cases and deaths reported each month are set out in detail :

Year	Jan.	Feb.	Mar.	Apr.	May	June	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1897	—	—	—	—	—	—	1	—	—	—	—	—	1 Case
	—	—	—	—	—	—	1	—	—	—	—	—	1 Death
1898	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—
1899	—	—	—	—	—	1	—	2	—	—	15	45	63 Cases
	—	—	—	—	—	—	—	—	—	—	13	32	45 Deaths
1900	10	—	—	8	39	19	3	—	24	18	25	22	168
	18	—	—	6	32	20	3	—	19	16	23	16	153
1901	1	—	—	1	—	1	—	—	—	—	—	—	3
	1	—	—	1	—	1	—	—	—	—	—	—	3
1902	—	—	1	—	1	—	—	—	—	8	—	4	14
	—	—	—	1	1	—	—	—	—	4	1	2	9
1903	6	—	—	—	6	7	3	3	11	14	8	—	58
	6	—	—	—	6	6	3	3	7	12	7	—	50
1904	—	—	—	—	—	—	—	—	—	—	—	1	1
	—	—	—	—	—	—	—	—	—	—	—	1	1
1905	—	—	—	1	9	34	8	2	8	4	81	135	282
	—	—	—	1	7	20	6	2	8	4	59	111	218
1906	28	4	7	17	47	73	51	36	30	102	93	10	498
	23	3	5	15	38	56	38	19	22	78	77	9	383
1907	9	5	5	18	42	13	12	3	18	105	265	151	646
	8	5	5	18	39	12	10	1	17	87	224	148	574
1908	19	12	4	15	22	21	5	10	63	73	48	55	347
	18	12	4	11	19	17	5	6	45	57	41	45	280
1909	13	1	3	24	39	18	19	11	34	106	98	23	389
	11	—	3	21	31	17	12	9	28	88	74	19	313
1910	4	2	3	6	1	5	1	1	—	11	15	—	49
	4	2	3	5	2	5	1	1	—	6	12	—	41
1911	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—
1912	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—
1913	—	—	—	—	—	—	—	—	3	11	12	1	27
	—	—	—	—	—	—	—	—	3	8	9	—	20
1914	1	—	—	18	20	27	12	4	—	—	—	1	83
	1	—	—	16	17	23	9	3	—	—	—	1	70
1915	—	—	—	—	1	8	8	3	—	—	—	—	20
	—	—	—	—	1	7	7	2	—	—	—	—	17
1916	—	—	—	—	—	—	—	—	—	36	19	22	77
	—	—	—	—	—	—	—	—	—	28	16	21	65
1917	1	1	—	2	13	3	5	—	—	—	—	—	25
	1	1	—	2	12	3	4	—	—	—	—	—	23
1918	—	1	—	—	—	—	—	—	—	—	—	—	1
	—	1	—	—	—	—	—	—	—	—	—	—	1
1919	—	—	—	—	—	1	—	—	—	—	1	1	3
	—	—	—	—	—	1	—	—	—	—	1	—	2
1920	—	—	—	—	—	—	—	—	7	6	8	1	22
	—	—	—	—	—	—	—	—	5	4	6	1	16
1921	—	—	—	—	—	—	—	—	1	—	1	—	2
	—	—	—	—	—	—	—	—	—	—	—	—	—
1922	—	—	—	—	—	—	13	2	1	37	51	14	118
	—	—	—	—	—	—	11	3	1	26	29	9	79

It will be noted that three years have been completely free from plague and that in five ·thers the incidence has been negligible. The most severe outbreak was that of 1907, when 646 ases with 574 deaths were recorded. Next in order of severity came 1906, with 498 cases and ;83 deaths, followed by 1909, with 389 cases and 313 deaths. It would appear that, from the niddle of 1905 until 1910, plague infection persisted in the country without remission, since when nore months have been plague-free than otherwise. The total number of cases and deaths attri-)utable to plague from 1897 until the end of 1922, amount to 2,897 and 2,364 respectively, almost nsignificant figures in themselves.

The disease has been most in evidence in the seaports and in the immediate neighbourhood)f such places. Infection has occasionally been carried inland, but has very rarely given rise to nything in the nature of an epidemic. The town of Osaka has suffered most; Kobe comes second

on the list. Together these two towns have been responsible for more than half the plague reported in Japan.

The seasonal prevalence of plague in Japan is neither as constant nor as characteristic as it is in severely-infected countries; there is a tendency, however, for epidemics to reach their height in the autumn months October-November.

Cases of terminal plague-pneumonia have been observed not infrequently, but no epidemic of pulmonary plague has ever been reported in Japan—a fact of much interest.

In all the larger ports of Japan, energetic rat destruction and systematic examination of such rats for plague infection is continually carried on. The microscopic examination of spleen smears of rats is the routine method employed. When plague is present in a town, an energetic rat campaign is carried out by means of poisoned baits and traps. Arsenic or phosphorus poisons are most commonly used, and traps are generally of the spring break-back variety. In most cases rewards are also paid for rats collected by the inhabitants.

The history of past plague outbreaks in Japan reveals the fact that cargoes of cotton from India, chiefly Bombay, have, on more than one occasion, been instrumental in introducing plague infection. A cotton-mill has several times been identified as the place from which an epizootic has started, and infection has several times been carried into the interior with cotton bales. It is not easy to see how baled cotton can afford shelter for rats, though infected rat-fleas, from rats nesting between the bales in an infected store or ship, might well be brought on board or ashore in such material.

At the present time Osaka is the only place in Japan infected with plague. For this reason, as well as the fact that Osaka has suffered more from the disease than any other Japanese town, a more detailed discussion of Osaka's plague experiences is called for.

Next to Tokyo, Osaka is the largest and most important commercial town of Japan; it has a population approximating 1,350,000.

Plague infection was first introduced into Osaka in November 1899, since when it has suffered from several relatively severe outbreaks of the disease. In the following table are set out the number of cases and deaths caused by plague and the number of plague-infected rats discovered

	Year	Cases	Deaths	Plague-infected Rats
1.	1899	26	24	21
	1900	127	114	111
	1901	0	0	50
2.	1905	129	105	554
	1906	143	118	2,008
	1907	561	509	3,237
	1908	91	85	4,038
	1909	29	27	214
	1910	12	12	64
3.	1916	1	0	17
	1917	0	0	24
	1918	0	0	1
	1920	0	0	5
	1922	85	60	256

The above table indicates that the plague history of Osaka is divisible into three periods. The first period lasted from November 1899 to June 1901, during which 153 cases with 138 deaths were reported and 182 plague-infected rats were discovered. Thereafter Osaka remained free from plague for four years. In May 1905 plague infection was again introduced, and for six years plague outbreaks were of annual occurrence. The following seven years, 1911-1916, were free from the disease, but in December of the latter year, evidence of a rat epizootic was again discovered which gave rise to one human case. A certain amount of rat plague was discovered in each of the three years 1917, 1918 and 1920, but no human cases of plague were reported. In November 1921 plague infection among the rats in the adjacent city of Kobe was reported, and the municipal authorities of Osaka took most stringent measures to prevent re-infection of their town. Rat destruction measures had been carried on without intermission since the early plague years; a reward of five cents was paid for each rat brought in. At this new threat of plague, rat destruction was undertaken with renewed vigour; the coastline was carefully watched and a rat extermination campaign was carried out in grain godowns and other places likely to become infected. In a few weeks, 31,174 rats were destroyed. For a time these measures were apparently successful, but on July 4th, 1922, a plague rat was discovered, followed shortly afterwards by the occurrence of a human case. Special rat destruction gangs were formed and energetic rat destruction carried out, more especially around the new focus of infection. The disease has not yet been stamped out (March 1923), but infection has been confined to two well-defined portions of the town. Plague cases that have occurred and the plague rats discovered since July 1922 are as follows :

Months	Cases	Plague-infected Rats
July	16	4
August	0	1
September	2	1
October	25	34
November	34	122
December	8	93
	85	256

The municipal expenditure on plague prevention during 1922 amounted to 337,000 yen.

One of the most striking features about the plague history of Osaka relates to the very large number of plague-infected rats that have been discovered in comparison with the number of human plague cases reported. From the first appearance of plague infection in 1896 until the end of 922, the total number of plague cases reported was 1,204 : the number of plague-infected rats liscovered during this same period of time was 10,600—in other words, 8.8 plague rats for each human case. Moreover, it will be noted that for several years, notably 1898 and 1917, the rat pizootic gave rise to no human case. A similar phenomenon has been observed in other outbreaks n Japan, and Shanghai has had a similar experience. This disproportion between human cases nd rat plague is a striking contrast to experience in the interior of British India, Formosa, and ertain other countries where severe plague epidemics have been experienced. As was pointed ut when writing of plague in Shanghai, it is almost certain that the explanation of this phenonenon will be found by a further study of the prevalent rat-fleas. A careful investigation of the at-fleas in Osaka was carried out during the early years of plague before the subdivision of the pecies *X. cheopis* into *cheopis*, *braziliensis* and *astia* had been effected. As is well known, these pecies are stated to vary in respect of the readiness with which they will feed on the human host. n any case *X. cheopis* appears to have been very rarely found in Osaka, and formed a very small ercentage of the total rat-fleas examined. "Flea counts" made in Osaka between October 1908 nd February 1909 yielded the following result : *Xenopsylla cheopis* 10.7 % of the total; *Ceratophylus* 53.9 %; and *Ct. musculi* 41.9. These results are interesting when compared with the obserations made this year in Shanghai (see the footnote on page 87 *supra*).

With regard to the rats of Osaka, 29.48 % are *R. norvegicus*, 68.9 % are *R. rattus*, and 1.62 % re mice. Of the rats found infected, 90.88 % have been *rattus*, the remaining 9.12 % *decumanus*.

Cholera.

Of all ship-borne diseases, cholera is by far the most important to Japan. Relatively severe utbreaks of cholera have been of very frequent occurrence, and such outbreaks are stated to have riginated invariably with cases of vibrio carriers from overseas. Cholera is not endemic in Japan.

The cases and deaths for which cholera has been responsible during each of the years 1910 o 1922 are set forth in the following table :

Year	Cases	Deaths
1910	2,849	1,957
1911	9	4
1912	2,720	1,683
1913	78	22
1914	5	4
1915	0	0
1916	10,371	6,260
1917	894	541
1918	0	0
1919	2,912	915
1920	4,985	3,121
1921	29	16
1922	730	417

In five of these 13 years reported cases of cholera exceeded 2,000 in number. The outbreak f 1916 was the most severe, when no less than 10,371 cases with 6,260 deaths were recorded; 920 comes second with 4,985 cases and 3,121 deaths. Acute cholera epidemics almost invariably ake place during the latter half of the year; the first six months are almost invariably cholera-ree. The spring of 1917 was exceptional in this respect, the infection of the previous autumn ot dying out until April.

The large seaport towns are generally the starting points of cholera epidemics, and infection ommonly spreads rapidly by means of small craft along the coast; the floating population, here s elsewhere, is difficult to control.

Of the several factors which make cholera so dreaded a disease in Japan, two appear to be of rime importance. The first is connected with the prevalent habit of eating much uncooked food; he second relates to the method of disposal of night-soil, to which reference has already been made. Raw fish is everywhere a common article of diet, and fish has on several occasions been incrimiated as the means by which infection has been conveyed. Closing the local fish-market is often ne of the earliest measures taken by the authorities in dealing with an outbreak of cholera in Japan. It is for this reason, too, that the Japanese authorities lay so much stress on the importance of keeping the waters of their ports free from contamination.

The measures taken by the port health authority to prevent the introduction of cholera nfection from overseas are dealt with in another section of this note.

Smallpox.

During the closing years of the last century, smallpox was a much more prevalent disease n Japan than it is to-day. On January 1 st, 1910, the present vaccination law (of 1909) (1)

(1) Primary vaccination was compulsory in Japan long before the passing of the 1909 *Prevention of Smallpox Bill* came into orce. The regulations framed in 1876 under the *Vaccination Act* of 1874 provided for compulsory primary vaccination. Calf-lymph s invariably used.

was brought into operation, rendering vaccination compulsory during the first three months o life, and re-vaccination compulsory when the child completes its ninth year. This law is now wel enforced and the population is becoming better vaccinated each year. Smallpox is thus littl likely to be a serious menace to the public health in future.

The cases and deaths ascribed to smallpox during each of the last 13 years are as follows :

Years	Cases	Deaths
1910	80	13
1911	202	34
1912	14	1
1913	108	39
1914	485	110
1915	17	3
1916	264	48
1917	5,121	1,158
1918	1,467	285
1919	4,055	1,115
1920	3,167	844
1921	889	212
1922	673	125

Cases of smallpox are much more numerous during the first six months than they are durin the latter part of the year.

Port Health Administration.

The Port Quarantine Law of Japan (1899) was amended in 1922. In this section the mor important articles of this law will be discussed, together with the regulations for their enforcement

Vessels coming from foreign ports are subjected to medical inspection. This inspection i carried out at either Yokohama, Kobe, Nagasaki, Moji (Shimonoseki), Tsuruga, Wakamatsu Miike or Kuchinotsu. No communication with the shore is allowed until this inspection is com pleted.

Germ-carriers may be treated as actual sufferers from the disease in question.

All vessels having a case of infectious disease on board, or which have had such a case durin the voyage, or which have communicated in any way with an infected port, must fly the quaran tine flag. Such vessels are only admitted to the ports where sanitary inspection is carried out

An infected vessel after disinfection may be detained ten days for plague, or five days fo cholera or yellow fever. The passengers and crew may be detained in a quarantine station. Pro vision is made for the destruction of rats and insects on board a vessel by fumigation, when thi is deemed necessary.

Should infectious disease break out among the passengers or crew in a quarantine station the period of detention may be renewed.

Infected ports are designated by public notification.

If requested, the master of a ship and the ship's doctor must sign a declaration in a prescribe form which give details regarding the ship; the port of departure; ports of call; passengers; officer and crew; source of the drinking water; description of cargo; port of destination; occurrence o plague, cholera, or yellow fever, smallpox, or scarlet fever, or any disease resembling these, durin the voyage; any deaths that may have occurred; any communication with a vessel infected wit any of the above diseases; mortality among rats; and any facts regarding medical examination disinfection, or detention to which the ship may have been subjected at other ports.

Fairly wide discretionary powers are given to the respective port health authorities to deter mine the measures applicable in any given case.

Medical inspection is carried out conscientiously. Very special attention is paid to the detec tion of cholera-carriers in the case of vessels which have come from, or touched at, a cholera infected port. The amount of work that this examination entails is sometimes enormous, bu the local authorities are of the opinion that the additional safeguard effected thereby is adequat recompense for the labour involved. There are difficulties in the strict application of this pro cedure in the case of cabin passengers, who are, however, of much less importance in this matter and recently this class of passenger has occasionally been absolved from the examination. Th port health authorities of no other country have done so much work as have those of Japan in thi matter of search for cholera-carriers.

As an illustration of the vast amount of work entailed, it may be noted that, during the thre months July to September 1922, approximately 11,500 bacteriological examinations of fæca samples were carried out at the one port of Moji (1), with the result that one healthy cholera carrier and one carrier who subsequently developed the disease during his period of detention i the quarantine station were discovered. The work in Moji was done by two bacteriologists wit four trained assistants.

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(1) The work done at the port of Moji in connection with the bacteriological examination of fæcal samples for cholera vibri during each of the last four years is as follows :

Year	Period during which examinations were made	Samples examined	Cholera	
			Cases discovered	Carriers discovered
1919	7 .7 .19-24 .12 .19	120,637	8	11
1920	13 .8 .20-29 .10 .20	59,687	4	5
1921	15 .8 .21-29 .10 .21	8,091	1	3
1922	1 .8 .22-25 .10 .22	11,578	1	1

The following table details the number of patients and carriers discovered as the result of ıedical examination at the various ports of Japan during the three years 1920, 1921, and 1922.

PATIENTS AND CARRIERS OF INFECTIOUS DISEASES DISCOVERED BY QUARANTINE DURING

1920

	Port	Patients	Carriers	Total	Vessel's Nationality	Ports of Departure and Ports of Call
holera . .	Moji	4	4	8	England	London, Marseilles, Bombay, Colombo, Penang, Singapore, Hong-Kong, Shanghai.
	Kobe	2	5	7	Japan	Shanghai.
	Nagasaki . . .	—	1	1	Russia	Unknown.
	Nagasaki . . .	1	—	1	America	Hong-Kong, Shanghai.
mallpox .	Yokohama. . .	2	—	2	England America	(Engl.) London, Hong-Kong, Shanghai (Amer.) Manila, Iloilo, Keelung.
	Tsuruga. . . .	1	—	1	Russia	Vladivostock.

1921

			Infected Rat			
'lague . .	Kobe.	1	1	2	Japan	Hong-Kong, Shanghai.
	Nagasaki . . .	—	1	1	Japan	Australia, Manila, Hong-Kong.
			Carrier			
holera . .	Moji	3	1	4	Japan	Tientsin, Shanghai.
	Kobe	1	—	1	England	London, Singapore, Hong-Kong, Shanghai.
mallpox .	Nagasaki . . .	2	—	2	England Japan	(Engl.) Hong-Kong, Shanghai. (Japan) Shanghai.

1922

holera . .	Moji	1	1	2	England	London, Marseilles, Bombay, Colombo, Penang, Hong-Kong, Shanghai.
	Nagasaki . . .	1	1	2	Japan	Fusan, Tsushima.
	Yokohama . .	2	—	2	England	London, Hong-Kong, Shanghai.
	Kobe.	4	—	4	America England	(Amer.) Shanghai, Taiku. (Engl.) Hong-Kong.
mallpox .	Moji	2	—	2	Japan	Korea.
	Nagasaki . . .	4	—	4	Japan	2 vessels from Shanghai. 2 » » Fusan.

The following table summarises the chief work of the port health staffs of Japan during the ıs two years :

THE WORK OF THE PORT HEALTH OFFICES OF JAPAN DURING 1921 AND 1922

1921

Name of Port.	Vessels inspected		Persons inspected		Vessels and Persons Disinfected		Infectious Diseases Discovered		Number of ships quarantined
	Japanese	Foreign	Crew	Passenger	Vessels	Persons	Cases	Deaths	
Permanent Stations.									
Yokohama.	1,247	572	155,173	115,742	13	115	1	—	14
Kobe	2,089	670	213,923	138,927	45	1,059	4	1	44
Moji.	3,873	340	235,974	399,832	71	264	4	—	70
Nagasaki.	449	191	66,714	72,423	32	344	2	—	32
Tsuruga.	190	1	7,602	7,491	—	—	—	—	6
Osaka.	1,746	27	77,104	14,370	10	—	—	—	3
Temporary Stations.									
Hakodate	396	22	10,307	23,502	—	—	—	—	—
Karatsu.	43	59	102	5,452	91	—	—	—	—
Yokkaichi	202	30	16,571	4,682	—	—	—	—	—
Kagoshima	90	1	3,758	274	—	—	—	—	—
Nagoya	289	15	13,055	1,722	—	—	—	—	—
Naha	14	—	559	1,170	—	—	—	—	—
TOTAL. . .	10,628	1,928	800,842	785,597	262	1,782	11	1	169

1922

Permanent Stations.									
Yokohama.	1,466	791	192,091	103,079	16	339	3	—	16
Kobe	2,069	860	240,620	131,576	45	77	3	—	43
Moji.	3,645	471	246,084	446,498	105	25	4	—	103
Nagasaki.	428	172	62,756	51,302	40	358	5	—	38
Tsuruga.	187	3	10,848	22,247	—	—	—	—	1
Osaka.	1,868	62	87,821	11,789	3	—	—	—	3
Temporary Stations.									
Hakodate	507	38	15,286	28,329	—	—	—	—	—
Karatsu.	61	62	6,095	1,155	—	—	—	—	—
Yokkaichi	227	59	19,584	4,260	—	—	—	—	—
Kagoshima.	94	—	2,960	59	—	—	—	—	—
Nagoya	484	40	23,764	4,035	—	—	—	—	—
TOTAL. . .	11,036	2,558	907,909	804,329	209	799	15	—	204

Staff of the Port Health Offices.

The six chief ports of Japan are Yokohama, Kobe, Moji, Nagasaki, Osaka, and Tsuruga A detailed and comprehensive inspection of the port health work at the three first-named port was carried out and a visit was also paid to Osaka.

At all these six ports all port activity, including port health work, is carried out under th direction of the director of the port, assisted by the harbour-master. The medical and quaran tine staff at each of these ports is as follows :

Officials	Yokohama	Kobe	Moji	Nagasaki	Osaka	Tsuruga
Chief Medical Officer	1	1	1	1	1	1
Asst. Medical Officers	1	1	2	1	—	—
Chief Veterinary Officer	1	1	1	1	1	1
Asst. Veterinary Officers	4	2	3	1	4	2
Medical Inspectors	2	2	10 (1)	3	2	1
Veterinary Inspectors	2	—	1	1	2	2
"Pharmacists"	1	1	1	1	1	1
"Inspectors" (2)	3	3	2	5	2	1

In addition to the above there is an adequate clerical staff at each port.

The medical inspectors are all qualified medical men. Their functions are similar to thos of assistant port medical officers, boarding vessels, etc. They are of a lower grade in the servic and they are not considered as "permanent appointments" in the port health service.

Quarantine Stations.

At Yokohama, Kobe, Moji and Nagasaki there are very well-equipped quarantine stations with adequate accommodation for cabin passengers and for between 200 and 300 deck passenger and crew. In each case this accommodation is capable of temporary increase at short notic should this be necessary. Of the three stations inspected, that of Yokohama (at Nagahama some nine miles south of the harbour on the western shore of Tokyo Bay) is perhaps the bes installed, but the station at Kobe, quite near to the harbour, and that of Moji, on an island a the western end of the very narrow strait separating the ports of Moji and Shimonoseki, are bot quite adequate and satisfactory. Detailed description of each of these stations is hardly neces sary for the purpose of this report: all have certain features in common. In each there is well arranged bathing accommodation and disinfecting apparatus, the latter being of the formalin an steam Japanese pattern. All are supplied with adequate and satisfactory hospital accommo dation for infectious disease, and a bacteriological laboratory. All were in admirable order.

There was a good and ample water supply in each of the ports visited.

Fumigation of Ships.

The method of ship fumigation employed in Japan is the so-called Giemsa-Nocht, Hambur method. A mixture of carbon monoxide and carbon dioxide, produced by the incomplete com bustion of coke, is the lethal gas. The apparatus is installed on lighters. There are two suc lighters at Yokohama, three at Kobe, two at Moji and one at Nagasaki. Ships at Osaka requirin fumigation would be dealt with at the adjacent port of Kobe; the trade of Tsuruga is not of suc a nature as requires the use of a fumigating plant. The method appears to work satisfactorily it is not dangerous, and is harmless to cargo. Its lethality to insects must, however, be que tioned. Appended are particulars of vessels fumigated by the Moji plant during the last fou years :

Year	No. of Vessels Fumigated (total tonnage)	Rats destroyed	Plague-infected Rats
1919	129 (410,952)	867	nil
1920	143 (587,124)	1,275	nil
1921	142 (559,357)	809	nil
1922	174 (687,836)	1,148	nil

Veterinary Work in Japanese Ports.

The table given above, detailing the medical and sanitary personnel employed at th more important Japanese ports, gives an idea of the importance attached to veterinar work at such ports. Not only are careful precautions taken to prevent the introductio

(1) The large number of medical inspectors on the health staff of Moji port is accounted for by the fact that each of the regul ships on the run between Moji and Formosa, and Moji and Korea, carries one of these officials, who investigates the health conditio of the passengers during the voyage.

(2) Assisting in enforcement of quarantine rules in addition to other port duties.

f cattle diseases into Japan, but at certain ports some important work is being done with egard to the disinfection of animal hair used in the brush and other industries. At Yokohama,)saka, Kobe and Tsuruga, there is a plant for the disinfection of animal hair installed at the nimal quarantine station. The apparatus used is known as the "S. K." type. The hair s put into a chamber into which formaldehyde gas is introduced after the chamber has been acuumised. The chamber is kept at a temperature of 60° C. The method as used appears to e successful in destroying anthrax spores in the condition in which these occur in imported air. The animal quarantine stations are equipped with bacteriological laboratories in which his disinfection is controlled. The animal quarantine stations are under the control of the)epartment of Agriculture and Commerce.

All the towns in which the above-mentioned ports are situated are possessed of well-equipped nfectious diseases hospitals and laboratories which could come to the assistance of the port uthorities in case of need.

Temporary Port Health Stations.

In addition to the six quarantine stations which have been considered above, there are at resent five "temporary" port-health offices at Hakodate, Yokkaichi, Karatsu, Nagoya and Kagoshima. The medical work done at these ports is confined more or less exclusively to inspection of ships. There are two or three medical inspectors at each. At Hakodate, however, there re also eight veterinary inspectors; the cattle trade of this port is important. In these ports he director of the police bureau of the prefecture also functions as director of the port.

In the above very inadequate summary of some of the results of this inquiry in Japan there re many omissions, some of which have been made intentionally. We were privileged to see nuch of the working of numerous most admirable laboratories; of medical schools and colleges; f general hospitals and infectious diseases hospitals; of public health work in Tokyo and in provincial towns; of water supplies and drainage schemes; and something of the admirable work being lone by the Red Cross Society of Japan. To deal with such matters would be outside the scope f this report, though the knowledge and information gained by such inspections was very necesary to the formation of an opinion regarding the value of the work being done in those branches f public health activity in which the Mission is directly interested. We have seen very much o admire and very little to criticise and we have been placed under a deep debt of gratitude y the cordial co-operation, abundant information and ungrudging help which we have received rom innumerable public health workers in Japan. Everything possible was done to make the nquiry easy and very pleasant. The large mass of material that has been placed at our disposal vill permit of very considerable amplification of most sections of this preliminary report if this e considered desirable subsequently. The statistical data that were worked up for us by the anitary Bureau of the Ministry of the Interior contain a wealth of information, of very great alue and interest, that has hardly been drawn upon in the above notes, though it has supplied s with all the figures here reproduced.

XII — FORMOSA

Quite apart from questions of trade, commerce, and geographical position, two considera tions prompted the inclusion of Formosa in the itinerary of the mission: the first relating t the improvement in health conditions, as evidenced by statistical data, which has taken plac since the Japanese occupation; the second relating to the interesting plague history of the island The freedom from plague which the island has enjoyed for the past seven years after, a long serie of plague epidemics, is a phenomenon sufficiently rare in the East to make it worth a close study.

The time available for the visit to Formosa was unfortunately very brief, and it was only possible to visit Keelung, the most important port; Taihoku, the capital; and the small port o Tamsui on the north part of the west coast. The visit was, however, of considerable value; i allowed of a study being made of the form of public health administration; and the large amoun of information obtained from numerous eminent officials, who have been for many years pas closely associated with anti-epidemic activity and medical research work in the island, was like wise of the greatest value.

Formosa, or Taiwan, is an island 264 miles long, and some 60 to 80 miles broad, with it long axis north-south, situated between 20° 56′ and 25° 15′ north latitude, and 120° and 122° eas longitude; the Tropic of Cancer thus divides the island about its middle. The eastern half o the island is very mountainous, and but thinly populated. Here dwell the aboriginal inhabi tants. The western alluvial plains support the majority of the population, which at the censu of 1921 numbered 3,757,838. Of these 3,481,833 were Formosan-Chinese; 166,621 were Japa nese; the aborigines numbered 84,548 (approximate figure), and the foreigners, including Chines other than Formosan-Chinese, 24,836.

The climate in summer is hot, especially in the south, and in some districts very wet The cooler months of the year are very pleasant.

Formosa has been a Japanese colony since 1895, when it was ceded by China—one of th results of the Chino-Japanese war.

The trade of the island is considerable, the exports largely exceeding the imports in value The most valuable products are camphor, rice, sugar, and tea; three-quarters of the world' supply of camphor come from Formosa.

For administrative purposes, the island is divided into seven prefectures, five large and tw small.

The public health administration is comparable to that of Japan. There is a public healt adviser, with a medical assistant and an adequate office staff, in the Central Government i Taihoku. Each of the seven prefectures has its own health administrative staff. That of th Taihoku prefecture, which was seen at work, will be described; the others are, however, exactl comparable.

In the central office of the Taihoku Prefecture, at Taihoku, there is a chief public healt officer, with one assistant and one inspector, both qualified medical men. In times of seriou epidemic or other emergency, this staff is increased as occasion may require. In addition ther are bacteriologists and chemists sufficient to staff the central laboratory.

The Taihoku Prefecture has a population of 773,905 of which 179,215 reside within th municipal limits of Taihoku city. As in Japan proper, public-health activities, including th registration of vital statistics and of cases of infectious diseases, are carried out in close co-opera tion with the police; periodic and frequent visits are paid to all houses by police officials, wh keep a register containing detailed information regarding the inhabitants of each house in thei respective districts. In this way it is claimed that the registration of vital statistics, etc., i carried out with as great accuracy in Formosa as it is in the mother country (excepting alway the aborigines, of whom information regarding health conditions is very scanty).

Information regarding epidemic diseases, births, deaths, etc., is transmitted by one or othe of the very numerous sub-police-stations to one or other of the headquarter police-stations. Medi cal practitioners likewise transmit such notifications to the headquarter police-stations. (Ther is one qualified medical practitioner for every 2,300 inhabitants of the island. Certain privat practitioners are subsidised by Government as part-time public health officials for rura areas.)

The headquarter police stations send weekly and monthly returns to the central office of th prefecture. In times of epidemic, medical practitioners report direct to this central office. Th central office sends its orders direct to municipal offices, where these exist, and also deals with the population directly, as well as transmitting instructions through the police agenc already described.

The prefecture is well provided with epidemic hospital accommodation. In Taihoku cit there is one epidemic disease hospital and two other hospitals in which epidemic diseases ar treated, all of them quite satisfactory for the purpose.

Chief Causes of Mortality.

The average annual death-rate for Formosa as a whole approximates 24 per mille. The death-rates for the Taihoku Prefecture during the past ten years are set out in the following table. The death-rate for the city of Taihoku in 1921 was as low as 17.53 per mille, a very creditable figure.

Mortality Statistics of Taihoku Prefecture.

Year	Population	Deaths	Death-rate per 1,000
1912	508,743	11,141	21.90
1913	523,271	10,923	20.87
1914	533,210	12,836	24.07
1915	541,530	12,600	23.27
1916	546,147	11,435	20.94
1917	552,015	11,047	20.01
1918	550,048	14,273	25.62 (1)
1919	747,990	18,870	25.23 (1)
1920	758,846	18,557	24.45 (1)
1921	773,905	16,667	21.54

There were 27,280 births registered in the Taihoku Prefecture in 1921, equivalent to a birth-rate of 35.25 per mille.

Infectious Disease.

The following table gives the number of cases and deaths attributed to certain of the more prevalent communicable diseases during each of the past ten years in Formosa :

Year	Typhoid Fever		Dysentery		Diphtheria		Smallpox		Scarlet Fever		C.-S. Meningitis	
	Case	Death	Case	Death	Case	Death	Case	Death	Case	Death	Case	Death
1913	1,059	212	223	80	119	39	—	—	7	—	—	—
1914	1,041	198	304	96	118	38	24	10	3	—	—	—
1915	929	197	445	85	111	41	80	29	1	—	—	—
1916	1,263	218	290	53	125	43	—	—	11	—	—	—
1917	977	209	245	34	117	44	2	—	7	—	—	—
1918	938	208	538	61	135	54	146	40	25	2	7	2
1919	1,412	235	363	44	144	38	303	48	12	—	15	14
1920	834	165	233	24	161	48	838	240	7	3	93	54
1921	985	184	299	43	195	46	6	2	13	—	480	261
1922	1,083	175	177	12	197	40	97	15	4	—	509	322

It will be noted that typhoid fever is more inevidence than any of the other diseases mentioned.

The incidence of dysentery is less than one would expect to find. The majority of cases of dysentery acquired in Formosa are of the amœbic type; bacillary dysentery appears to be rare except among the aborigines.

Cases of diphtheria constantly occur, but in no large numbers.

Scarlet fever is relatively a rare disease, mild in type, with an exceedingly low case mortality rate.

Typhus fever is practically unknown; no case of relapsing fever has been reported in the island.

Smallpox is not a common disease in Formosa. The population is relatively well vaccinated : the Compulsory Vaccination Law of Japan applies also to Formosa. A large proportion of the cases recorded in the above table occurred among Chinese immigrant labour forces.

The cases of cerebro-spinal meningitis reported occurred chiefly among recently imported labour forces from China.

Influenza prevailed in serious form during the years 1918, 1919 and 1920. This fact is of great interest : Hong-Kong, Shanghai, and adjacent parts of China escaped the ravages of the pandemic almost completely.

Malaria is less prevalent than formerly. Its incidence in towns is very low, but in certain rural tracts it is still a very important cause of morbidity.

Kala-azar is non-existent.

Tsutsugamushi disease is endemic in East Formosa.

Cholera.

The following table gives all the cases and deaths ascribed to cholera during the past 28 years (1896-1923) :

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(1) Pandemic of influenza.

Years	Cases	Deaths	Years	Cases	Deaths
1898	1	—	1912	333	256
1901	1	1	1916	34	18
1902	748	613	1917	2	1
1903	1	1	1918	1	1
1904	1	1	1919	3,835	2,696
1907	3	2	1920	2,670	1,675
1910	13	8	1921	1	—

The years not mentioned were free from the disease.

The above table demonstrates that cholera epidemics are not of very frequent occurrence in the island of Formosa; it also appears that the disease is not endemic. The serious outbreak of 1919 started among recent arrivals from China, which was suffering that year from a widespread epidemic; this was a year of abnormally widespread prevalence throughout the East. The epidemic of 1920 was possibly a survival of the previous year's outbreak. The epidemics in both these years appeared to come to an end in the month of December.

Cholera vaccination was extensively carried out : in 1920, 1,215,869 persons, 37.9 per cent of the total population of Formosa, were given one or two injections of a cholera vaccine. The case mortality rate among people who had been inoculated and who afterwards suffered from the disease is stated to have been appreciably lower than that of the uninoculated cases.

Plague.

The freedom from plague which Formosa has enjoyed since 1917 makes a study of the history of the disease in the island of considerable interest. Plague first appeared in Formosa in 1896 : infection was introduced into three Formosa ports, from Hong-Kong or China, during the years 1896-97—Tamsui in the north, Tainan in the south and Bankoga in the middle of the west coast. (It will be recalled that the present pandemic originated in Canton in 1894, rapidly spread to Hong-Kong and southern Chinese ports, whence infection was carried by ship to many parts of the East.) In view of the very considerable communication by junks and small craft between Formosa and the mainland, the early infection of Formosa was almost inevitable at a time when so little was known regarding the methods of spread of the disease.

For a time the disease prevailed chiefly in the neighbourhood of the three ports mentioned, but it subsequently involved the whole of the low-lying western half of the island; the thinly-populated mountainous eastern half was never infected.

The monthly incidence of human plague cases reported from 1897 to 1917 is set out in the following table :

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals	
													Cases	Deaths
1897	8	10	35	179	321	129	21	3	—	—	2	22	730	566
1898	40	40	120	438	473	82	34	1	1	1	—	3	1,163	882
1899	56	134	705	830	497	222	46	20	3	11	37	76	2,637	1,995
1900	53	46	106	261	378	155	37	4	4	3	3	29	1,079	809
1901	99	63	212	838	1,454	1,264	340	54	34	36	32	70	4,496	3,670
1902	159	140	231	366	721	419	150	36	4	2	5	75	2,308	1,853
1903	67	52	114	238	233	87	63	10	1	6	2	12	885	708
1904	29	119	558	1,596	1,276	446	107	40	6	45	81	197	4,500	3,374
1905	280	180	329	569	734	252	36	2	—	1	2	13	2,398	2,100
1906	48	93	203	799	1,048	597	137	7	7	31	100	202	3,272	2,609
1907	165	203	303	448	745	537	176	14	—	1	—	—	2,592	2,241
1908	17	57	140	314	538	196	7	—	—	—	—	—	1,269	1,058
1909	1	38	115	222	295	212	133	11	—	—	—	—	1,027	849
1910	3	—	9	7	—	—	—	—	—	—	—	—	19	18
1911	3	21	19	78	196	63	—	—	—	—	—	—	380	334
1912	—	—	—	51	74	60	35	3	—	—	—	—	223	184
1913	—	—	13	43	37	37	6	—	—	—	—	—	136	125
1914	—	32	51	112	203	125	36	8	—	—	—	—	567	488
1915	2	11	12	35	7	7	—	—	—	—	—	—	74	66
1916	—	—	—	—	—	—	2	1	1	—	—	1	5	4
1917	4	1	2	—	—	—	—	—	—	—	—	—	7	7
													29,767	23,940

The energetic measures taken in the early years were successful in eradicating infection from many of the infected areas. In 1910 the Kagi district, in the middle of the west coast, was the only infected area left; here infection persisted for the next five years but was finally stamped out. In 1914 and again in 1916, infection was re-introduced into the small junk port of Tamsui, Taihoku Prefecture; all the few cases that occurred during 1916 and 1917 were confined to the neighbourhood of Tamsui.

It will be noted that the total plague cases reported in Formosa during the 21 years amounted to 29,767, of which 23,940 proved fatal, a case mortality rate of 80.4 per cent.

In spite of the marked variations in severity which characterised the epidemics of different years, there is a remarkably constant seasonal prevalence. All the outbreaks without exception reached their height in the months of April or May. The four months August to November were those of minimum plague incidence, months in which plague epidemics in Japan commonly reach their height.

Several interesting observations regarding the rats and rat-fleas of Formosa were made and published during the period of plague epidemics. *Rattus, decumanus,* and mice are all prevalent

n Formosa, as well as certain varieties of field-rats, but, from the point of view of plague, *Rattus attus* is far and away the most important. *Decumanus* was occasionally found infected with lague, but not nearly so frequently as was *rattus*. With regard to rat-fleas, observations carried ut between 1907 and 1910 showed that approximately 50 per cent belonged to the genus *Xenosylla*. Of the remainder *Ctenopsylla musculi* and *Ceratophyllus fasciatus* were most in evidence.

The proportion which the number of plague-infected rats found in Formosa bears to the number of human plague cases that occurred is much lower than was observed during most of the plague pidemics in Japan proper. Thus, in 1906 the average number of plague rats discovered for each uman case reported was 0.46 in Formosa, 1.27 in Osaka, 36.0 in Kobe. Corresponding figures or 1907 were : 0.17 in Formosa, 5.9 in Osaka, and 208.5 in Kobe. Without detailed information as o the measures taken in each case for the detection of plague-infected rats, it would not be justifiible to press the comparison too far, but the mildness of human epidemics of Japan when contrasted with the virulence of rat epizootics is most remarkable.

It is almost certain that a detailed study and comparison of the rat-fleas of Japan and Formosa would afford an explanation of the relatively much lower incidence of human plague in Japan. Fleas of the genus *Xenopsylla* are relatively rare in Japan, though their presence was always noted in times of plague. When the Japanese observations were carried out, the distinctions between the three species *cheopis*, *astia*, and *braziliensis* had not been recognised.

The anti-plague measures adopted with such success in Formosa were chiefly measures of rat destruction. The following figures, which give the total number of rats examined during some of the years of maximum plague infection in Formosa, give some idea of the energy and persistence with which these measures were carried out.

Years	Rats examined
1904	221,852
1905	243,303
1906	336,380
1907	416,210
1908	711,399
1909	903,446
1910	792,419
1911	792,547

The rat destruction measures employed consisted not only in the use of traps and poison-baits, but also in the search for rat nests and burrows. In many of the worst-infected areas the cleaning up of the houses frequently entailed partial or complete demolition, with subsequent reconstruction in such a manner as to diminish the amount of shelter afforded the rat. This wholesale cleaning up was persisted in with praiseworthy energy. The fact that the disease has been completely eradicated is a triumph for the public-health authorities of the island. All who have engaged in anti-plague work in similar conditions can visualise the difficulties that were successfully overcome.

In view of the tremendous effort that was necessary to free the island from infection, and of the fact that infection has been introduced by shipping on no less than five occasions, it is somewhat surprising that the measures taken to prevent a reintroduction of infection have not been more stringent than they have been and are. Precautions are certainly taken with regard to the unloading of "suspicious" cargo arriving from plague-infected ports, but the fact remains that the port authorities do not at present possess any fumigation apparatus for the efficient fumigation of ships or junks. This matter is now being considered and adequate apparatus will doubtless be forthcoming in the near future.

Though Formosa has been free from plague for six years, it is satisfactory to note that rat-destruction measures still engage the attention of the authorities in ports and large towns. Rewards are paid for rats brought in. In Taihoku, Keelung, and other towns, there is also a rat "lottery". In Taihoku, as soon as 10,000 rats have been collected, the rat "contributors" participate in a lottery, the first prize of which is 100 yen; there are also 23 smaller prizes. This ingenious method of stimulating and sustaining interest in rat suppression might be applicable to other places where the rat is a serious menace to health and property.

The following figures indicate the number of rats brought in and examined each year in Taihoku, Keelung, and Tamsui respectively, since 1916.

Rats "bought" and examined in Taihoku Prefecture.

	Taihoku		Keelung		Tamsui	
	Bought	Examined	Bought	Examined	Bought	Examined
1916	161,148	137,177	9,988	—	22,363 (1)	—
1917	102,179	85,894	6,215	4,830	37,015 (2)	—
1918	97,900	73,419	5,407	4,374	25,979	—
1919	82,241	63,990	3,036	2,738	34,101	—
1920	66,143	53,445	16,689	10,862	22,892	16,597
1921	92,236	58,527	29,655	21,699	23,854	20,045
1922	93,411	69,895	41,446	31,104	18,890	—

(1) 21 plague-infected.

(2) 14 plague-infected.

Public Health Expenditure.

As an illustration of the expenditure incurred each year on behalf of public health work in Formosa, the following figures which relate to the last budget of the Taihoku Prefecture are of interest :

(1) *Sanitation and hospitals :* yen 157,171.

This sum includes provision for the subsidy of medical practitioners as part-time health officials, but it does not include the salaries, etc., of the numerous Government medical employees.

The items of this expenditure run as follows :

	Yen
"Public medical practitioners"	19,054
Prevention of Infectious Diseases	39,839
Prevention of Malaria	38,219
Venereal Disease	22,882
Tuberculosis	22,447
General Sanitation	14,737
Total	157,171

In addition to the above, there was a special fund for epidemic disease prevention at the disposal of the health authorities of the Taihoku Prefecture during the year in question amounting to yen 97,500.

Excluding the last-named special provision, the normal public health expenditure is equivalent to rather more than 20 sens per head of population per annum (about 4½ pence).

Port Health Organisation in Formosa.

The two most important ports in Formosa are Keelung, at the north extremity of the island, and Takao, in the south on the western coast.

In Keelung there is a port medical officer with two medical assistants; three medical inspectors; seven quarantine officers (non-medical); two veterinary inspectors; and a pharmacist. This staff also looks after the port health work at the adjacent small junk harbour of Tamsui.

At Takao, there are five medical inspectors.

The Japanese quarantine laws and regulations apply also to Formosa : further discussion of them is unnecessary here. The number of vessels, passengers, and crew inspected at the three ports during 1922 (a representative year) was as follows :

	Vessels inspected	Crew inspected	Passengers inspected
Keelung	1,276 (1,047 steamers)	67,141	65,053
Takao	560	20,299	2,621
Tamsui	369 (68 steamers)	7,561	1,037

Reference has been made above to the fact that Formosa possesses at present no special apparatus for the fumigation of ships. Ship's cargo from plague-infected ports is, however, fumigated in specially-constructed chambers with sulphur dioxide gas. Precautions are also taken to prevent ship rats coming or being brought ashore. Attempts are also made to kill rats on board ships by poison and traps. The number of rats accounted for in the three ports during 1922 were as follows :

Keelung	858
Takao	226 (from 53 vessels).
Tamsui	16

There is a well-designed and adequately equipped quarantine station in Keelung, with accommodation for 40 cabin passengers and 480 deck passengers and crew. A small infectious diseases hospital is attached, with accommodation for 15 patients.

There is a good water supply at both ports.

Both towns Keelung and Takao are provided with adequate infectious disease hospital accommodation and a laboratory.

Keelung is a very rapidly growing town, with a population of 132,390 in 1922, as compared with only 38,976 in 1918. The incidence of infectious disease in Keelung is low : the cases reported during 1922 were as follows : Typhoid fever 77 cases; dysentery 4; cerebro-spinal meningitis 25; smallpox 1; diphtheria 5.

Takao is a smaller town, with a population in 1922 of 39,370, as compared with 18,456 in 1918. Infectious diseases notified in Takao during 1922 were as follows : Typhoid fever 67 cases; diphtheria 12; dysentery 3; cerebro-spinal meningitis 4.

In the following two tables the number of beri-beri patients treated in the Government hospitals of Formosa and by Government-subsidised private practitioners during some recent years is set out in detail.

Number of Beri-beri Patients treated in the Government Hospitals.

Name of Government hospital	1919	1920	1921	1922	Total
Taihoku	492	311	130	28	961
Keelung	113	77	76	32	298
Giran	159	243	187	177	766
Shinchiku	29	31	45	32	137
Heito	48	23	21	42	134
Takao	149	87	86	129	451
Tainan	73	91	36	91	291
Karenko	18	78	7	9	112
Boko	26	31	21	30	108
Taichu	221	222	195	190	828
Kagi	78	141	156	46	421
Taito	31	24	56	46	157
TOTAL	1,437	1,359	1,016	852	4,664

Number of Beri-beri Patients treated by Government subsidised General Practitioners.

	1917	1918	1919	1920	1921	Total
Taihoku Prefecture	500	567	382	318	140	1,907
Shinchiku Prefecture	202	236	155	125	190	908
Taichu Prefecture	202	148	154	130	97	731
Tainan Prefecture	111	207	144	46	64	572
Takao Prefecture	104	179	71	105	650	1,109
Taito-cho	79	29	33	23	103	267
Karenko-cho	251	192	179	125	—	747
TOTAL	1,449	1,558	1,118	872	1,244	6,241

XIII — KOREA (CHOSEN)

Chosen or Korea, the peninsula lying south of East Manchuria, between 23° 6′ and 43° 36′ north latitude and 124° 11′ and 130° 56′ east longitude, has an area of 84,000 square miles. On the north it is separated from Manchuria and the Russian maritime province by the Yalu and Tuman rivers and a mountain range, Fukanzan. The Sea of Japan washes the eastern coast, and the Yellow Sea the west coast of the peninsula. The length of coastline measures approximately 1,700 miles.

The population of Korea in 1920 was 17,288,989 : of this total, 16,916,078 were Koreans and 347,850 were Japanese. The density of population thus approximates 205 persons to the square mile. Among the Korean population, males are in excess of females in the proportion of 100 to 94.25.

Korea was united to Japan as recently as 1910, since which date very appreciable progress has been made in many directions, not least in the domain of public health.

The administration of Chosen is in the hands of a "Government-General" with a Governor-General at its head. The Governor-General is assisted by an Administrative Superintendent, who is responsible for the working of the various administrative departments and bureaus of the Central Government in Keijo. In Keijo there is a Central Council, composed of Korean officials, with advisory functions.

Korea is divided into thirteen prefectures, each in the charge of a governor. These prefectures or provinces contain 12 municipalities (1) and 218 *gun* or counties. These counties are further subdivided into "villages". Each municipality has a mayor, and each county has an administrative chief. Each village has its head-man.

The Secretariat of the Government-General in Keijo is divided into three departments and six bureaus, *viz*: a general affairs department; an engineering department; a railway department; and bureaus for home affairs; finance; agriculture, commerce and industry; judicial affairs; education; police.

As in Japan proper, public health activity in Korea is carried out in close co-operation with, or through, the police. The Central Sanitary Bureau in Keijo is a section of the police bureau. This Central Sanitary Bureau possesses a public health laboratory.

Comparatively recently, the gendarme force, which was responsible for the preservation of law and order, has been replaced by a police force modelled on that of Japan. Provincial police are under the control of provincial governors. There is a police office in nearly every village of Korea. In 1920 this police force numbered 20,083, distributed among 251 stations, 143 sub-stations, and 2,354 police offices.

In the headquarters of each provincial government, there is a provincial sanitary bureau attached to the provincial police bureau. All the prefectures, with the exception of one, possess a public health laboratory and each province has a sanitary expert.

In Keijo there is a central board of health presided over by the Administrative Superintendent. This board, composed both of officials and non-officials, has consultative and advisory functions. There is also a special committee which deals with epidemic investigation and prevention.

The centre of medical activity in Korea lies in the Government General Hospital and Medical College in Keijo. The hospital and college are adequately equipped and admirably administered. Approximately two-thirds of the students are Koreans, the remainder being Japanese. Already some 500 medical graduates have passed through the college, and in the immediate future it is expected that about 100 students will qualify annually. It is intended to make this Medical College of Keijo the medical faculty of the Keijo University, which it is hoped to establish in the near future.

A private medical school in Keijo, which owes its existence to missionary enterprise, is doing, and has been doing for several years past, most admirable work.

There are charity hospitals in all provinces and in several towns in Korea. Twenty-seven such hospitals are functioning at present, and schemes for the construction of eight additional hospitals have been sanctioned.

The total number of qualified medical practitioners in Korea approximates 1,500, that is to say, one doctor per 11,000 of population. In rural districts there are 228 qualified medical practitioners who are subsidised by Government as part-time health officials.

Public health legislation and procedure is modelled on that of Japan. Vital statistics are recorded in exactly similar manner by the police, who are also responsible for reporting cases of infectious disease that come under their observation. Though births, deaths, and cases of infectious diseases are not recorded with the accuracy that they are in Japan, the error is probably not very great, except in remote districts.

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(1) There are only three towns in Chosen with a population exceeding 50,000, *viz*: Keijo (Seoul) 250,208; Fusan 73,855, and Heijo 71,703.

The Central Government has given considerable attention to the question of water supplies. Most of the larger towns are now well provided for. Numerous grants have also been given by the Central Government for the construction of public wells in rural areas throughout the country.

Speaking generally, the disposal of human excreta is primitive. Nearly everywhere hand-removal is the "system" employed. Untreated excreta are applied directly to the land as manure. It is this lack of method of excreta disposal which makes the Korean village so unsavoury and deplorable a place from the health point of view, and it is surprising that the incidence of intestinal disease is not higher than it is reported to be.

The ordinary Korean native house is built chiefly of mud, or mud and stone, with a timber framework. Practically all houses are single-storied, with thatched roofs. The system of heating these houses is characteristic. A fire is lit below the stone mud-plastered floor, and the heated air and smoke, passing through horizontal flues below this floor, escapes through the chimney on the opposite side of the dwelling to that on which the fire is lit. Such a method of heating certainly keeps the house dry, and is also probably effective in diminishing the degree of rat infestation of the house. (Chosen has never suffered from bubonic plague.)

Births and Deaths.

The birth-rate among the Korean population of Chosen was 34.15 per 1,000 in 1918, and 27.78 in 1919. In the latter year, 113 male births were reported for every 100 female, a ratio which indicates some defect in female birth registration.

Below is given in tabular form the total deaths recorded in Korea each year from 1917 to 1921 for the Korean community, with the death-rates per 1,000 of population :

1917		1918		1919		1920		1921	
Deaths	D/Rate	Deaths	D/Rate	Deaths	D/Rate	Deaths	D/Rate	Deaths	D/Rate
402,410	24.6	515,243	30.8	348,505	22.9	394,988	23.3	337,934	19.9

The relatively high rate recorded in 1918 indicates the severity of the influenza pandemic in Chosen : the incidence of other infectious diseases, notably cholera, was much lower in 1918 than it was in the following years.

Communicable Diseases.

Most diseases that prevail in temperate climates are prevalent in Korea, as well as certain other diseases that prevail with greatest intensity in tropical or subtropical regions.

Tuberculosis, chiefly pulmonary tuberculosis, is extremely prevalent; bovine tuberculosis occurs, but does not appear to be common.

Syphilis is widespread.

Pulmonary *distomiasis* (*Paragonimus westermani*) prevails throughout the peninsula : the number of sufferers from this disease is estimated at 30,000.

Ankylostomiasis is widespread.

Malaria, elephantiasis, and goitre are all endemic.

Leprosy is a very common disease; according to the police returns, lepers in Korea number 3,000, but those who have studied the problem consider this to be a gross under-estimate; it is probable that the actual number falls little, if anything, short of 10,000. (There is one Governmental institute for lepers and three missionary leper asylums, which are doing admirable work.)

Beri-beri is always present. During the five years 1917 to 1921, the deaths ascribed to beri-beri among the Koreans numbered 1,643, 1,914, 1,584, 900 and 1,306 respectively. The incidence of this disease per 1,000 of population appears to be even greater among the Japanese than among the Korean members of the community. In these five years the numbers of Japanese who died from beri-beri were 159, 210, 123, 115 and 116 respectively.

Of the acute epidemic diseases, dysentery, typhoid fever, paratyphoid fever, typhus fever, smallpox, scarlet fever, and diphtheria are always present, though varying in intensity from year to year. Cholera has in certain years been responsible for more deaths than all the other infectious diseases put together, but it is very doubtful whether cholera can be considered endemic. In several years during the last decade, the country appears to have been completely free from cholera. No indigenous case of plague, either pneumonic or bubonic, has ever been reported from Korea.

Below is given in tabular form the number of cases and deaths for each of the above-mentioned diseases that have been notified during each of the past five years.

Year	Cholera		Dysentery		Typhoid		Paratyphoid		Smallpox		Typhus		Scarlet Fever		Diphtheria	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1918	—	—	1,126	267	3,750	703	1,113	92	330	111	108	22	125	12	333	107
1919	16,991	11,084	1,522	407	3,266	642	650	84	2,180	675	837	121	124	21	278	73
1920	24,229	13,568	974	253	2,140	422	220	23	11,532	3,614	78	20	371	106	265	69
1921	1	1	978	311	2,535	485	300	53	8,316	2,527	73	18	717	209	248	93
1922	40	23	1,932	529	3,801	768	473	52	3,676	1,160	63	18	585	139	265	101

Fevers of the typhoid and paratyphoid group and dysentery appear to be relatively much more common among the Japanese than among the Korean members of the community. Thus, of the total of 6,532 cases and 1,767 deaths attributed to dysentery in the above table, no less than 4,352 cases and 992 deaths occurred among the Japanese. Similarly with typhoid fever: the total cases and deaths of typhoid fever recorded in the above table amount to 15,492 cases and 3,020 deaths; of these, 6,124 cases and 1,306 deaths were among the Japanese community. Of the 2,756 cases and 284 deaths for which paratyphoid fever was responsible, 1,386 cases and 112 deaths were Japanese. How far this apparent greater prevalence of these diseases of the intestinal group among the Japanese can be explained by more accurate diagnosis it is difficult to say. The suggestion has been put forward that unrecognised typhoid infections during infancy are responsible for the apparent relative immunity of the adult Korean population.

Scarlet Fever.

The prevalence of scarlet fever appears to have increased during recent years: its virulence has also increased and the case mortality rate is high. The severity of this disease in China at the present time is likewise remarkable: cases of a very severe nature are common in Peking.

Typhus Fever and Relapsing Fever.

Typhus fever as well as relapsing fever make their appearance from time to time, chiefly among the coolie population engaged in railway constructional work and suchlike undertakings.

Plague.

As has been stated, no case of plague, either bubonic or pneumonic, has ever been reported from Korea—a fact of very considerable interest in view of the trade relationship of several of the ports with parts of the world that have been infected with bubonic plague, and the close proximity of Korea to territories in which pneumonic plague has been responsible for devastating epidemics. How far this freedom from plague infection may be attributed to the action taken by the local health authorities is difficult to say. The chief danger has undoubtedly been from the north during pneumonic plague epidemics; this matter will be discussed at greater length when the public health activities of the South Manchurian Railway Company are under discussion.

Cholera.

Korea has been subject to periodic visitations from cholera since a very remote date. During the present century, there was a severe and widespread epidemic in 1902, when 10,000 cases occurred in Keijo alone. Cholera outbreaks also occurred in 1906, 1907, 1908 (1,791 cases), 1912 and 1916 (2,069 cases). The figures reproduced in the above table indicate the severity of more recent outbreaks. In 1921 only one imported case was reported from Fusan. In 1922, 40 cases were reported; these all occurred in North Heian-do. It will be noted that the epidemics of 1919 and 1920 were much the most serious of recent years. During these two years, cholera was very widespread and severe throughout the Far East. In 1919, infection was introduced into Chosen early in August through Antung, a port at the mouth of the Yalu River. In the following month infection was also introduced from Vladivostock into the port of Seishin on the east coast.

The 1919 epidemic resulted in 16,991 cases, of which about 11,084 were fatal, a case mortality rate of 65.2 per cent. Infection persisted from August until the end of the year. The western districts were most severely infected, the province of Kokaido suffering most, followed by Heian-nando and Heian-hakado, the two most northerly provinces in the west of Chosen. Most energetic measures were taken to prevent the spread of infection. During the course of the epidemic 1,070 carriers were discovered and isolated.

It is not clear whether the outbreak of 1920 was a recrudescence of the previous year's epidemic. It started earlier than usual, but it is reported that infection was reintroduced into Chinnampo, on the west coast, and into Chinkai, on the southern extremity of the peninsula, from Japan, as early as the latter half of June.

The ensuing epidemic, which was responsible for 24,229 cases and 13,568 deaths, started in the month of June; the last case was recorded on December 8th. On this occasion the most severely infected areas were in the south and south-east coastal districts of the peninsula. The case mortality rate was considerably lower than that of the previous year's epidemic. During this outbreak 3,676 carriers were discovered.

Most of the sea traffic of Korea is with Japan, and it would seem that Korea runs little risk of cholera infection except in those years in which Japan is infected.

Cholera vaccination has been carried out on a very extensive scale. The number of people submitting themselves to cholera vaccination during each of the last four years has been as follows:

1919	1,444,318
1920	5,242,469
1921	884,280
1922	1,112,822

Smallpox.

Smallpox is still widely prevalent and is, in certain respects, the most important of the endemic ontagious diseases, being looked upon by the Korean population as an experience which most, not all, must undergo. Vaccination is now making headway. The number of vaccinations erformed each year since 1911 has varied between 1,300,000 and 2,200,000. There was a arkedly decreased prevalence of smallpox from 1913 to 1919, but in the latter year a relatively evere epidemic prevailed, and the disease has been widespread ever since.

The Trade and Ports of Korea.

The import and export trade of Korea has increased remarkably since the annexation of the ountry by Japan. The combined value of the exports and imports in 1920 amounted to 447 million yen, as compared with 60 million yen in 1910. Seventy per cent of this trade is with Japan roper, other countries taking only 14 per cent of the exports, but supplying 43 per cent of the nports. Next to Japan proper, China is of most importance, both from the point of view of xport and import trade.

Fusan, Jinsen, and Genzan are the three most important ports, the first-named having by ar the largest share of the trade. All these three ports have quarantine and port health staffs. Quarantine officers are also stationed at the small ports of Gunzan, Moppo, Chinampo, and Seishin. Fusan is the only Korean port that was inspected.

The Port of Fusan.

Fusan Harbour is situated at the extreme south-east corner of the peninsula, at the head of fine bay protected on three sides by ranges of hills. The bay is divided down the centre by etsuei Island and two smaller islands into an eastern and a western half : it is only the former hich is of sufficient depth to permit the entrance of vessels of any considerable size.

The harbour contains two piers, the northern one of which allows vessels up to 20,000 tons to me alongside. Railway tracks are laid on the pier. A breakwater is being constructed at the outh of the harbour.

The port health staff at Fusan consists of a chief port health officer with two assistant medical fficers. There are also two non-medical quarantine officers.

The quarantine station is situated on the east coast of the bay outside the breakwater, about our miles by sea from the centre of the harbour. As there is no road connecting the harbour with is quarantine station, its position is inconvenient, especially in rough weather. The proposal or its removal to a more accessible position has been under consideration.

The quarantine station consists of temporary wooden buildings. There is accommodation or about 400 persons. The bathing and disinfecting plant, hospital, laboratory, and offices are dequate, though in an indifferent state of repair, and by no means luxurious. The station has ot been used since 1920, when 119 people were detained. In 1919, the number of persons who assed through the station was 3,845.

As in the ports of Japan proper, a large amount of work is done in times of cholera in connexion with the search for cholera-carriers. In 1920, the last severe cholera year, 10 patients nd 15 carriers were discovered and isolated.

Owing to the widespread prevalence of smallpox throughout Korea, the port health regutions of Chosen ports do not regard smallpox as a "quarantine disease".

There is an admirable veterinary quarantine station at Fusan. The cattle trade of Korea very considerable, and Fusan is the most important port from the point of view of this trade.

Near Fusan are situated the Government Veterinary Institute and Research Laboratories. his institute is admirably equipped and a large amount of interesting research work is being one. The institute supplies rinderpest serum for the whole Japanese Empire and other veterinary vaccines and serums; it also supplies smallpox calf lymph for Korea.

There are an infectious diseases hospital and a public health laboratory in Fusan under municipal control.

Fusan is not supplied with any special apparatus for the fumigation of ships : it has never een plague-infected. Examination of rats caught in the harbour area and town is carried out.

KEIJO (SEOUL).

In Keijo, inspections were made of the General Hospital, the Medical College, the Government acteriological Laboratory, Infectious Diseases Hospital, the Severance Union Medical College nd Hospital, and the waterworks. All the above-named institutions are doing admirable work. he Infectious Diseases Hospital contains 80 beds; this accommodation could be doubled should ccasion require. At the time of our visit there were cases of smallpox, diphtheria, typhoid, and carlet fever. During 1922 the cases treated in this hospital were as follows : Smallpox, 81 cases, nd 17 deaths; diphtheria, 4 cases and 1 death; scarlet fever, 75 cases and 15 deaths; dysentery, 75 cases and 38 deaths; typhoid fever, 100 cases and 31 deaths; paratyphoid fever, 21 cases and o death; and one case of typhus fever.

XIV — MANCHURIA

Considerations of pneumonic plague, and the possibility of the infection of pneumonic plague being spread by shipping from Manchurian ports, prompted the extension of the tour along the South Manchurian Railway and as far north as Harbin. Visits were also paid to the port of Dairen, in the Kwangtung leased territory, and the port of Yingkou (Newchwang), near the mouth of the Liao River in the Gulf of Pechili (Liao-Tung).

Plague in Manchuria and Adjacent Territory.

Before referring to the medical and public health organisations of the South Manchurian Railway, and of the North Manchurian Plague Prevention Service, it may be useful to say something regarding the geographical distribution of plague in Manchuria and adjacent territory.

Bubonic Plague.

Bubonic plague has been very little in evidence in this part of Asia, but the few outbreaks which have occurred are of singular epidemiological interest.

It has already been stated that Korea has never been infected with plague, and as regards bubonic plague, the Liao-Tung Peninsula has enjoyed a like immunity.

The port of Yingkou (Newchwang), was infected with bubonic plague in 1898, and remained infected until 1906; the most severe epidemic occurred in 1899; when 2,000 plague deaths were reported (Wu Lien Teh). Very considerable rat mortality was noted during these years. Since 1906, Newchwang has been completely free from plague of all kinds. Its complete immunity during the severe Manchurian pneumonic plague outbreaks of 1910-1911 and 1920-1921 is noteworthy.

(In 1898 an outbreak of bubonic plague was also reported from Tongshan, a mining centre three hours by rail from Tientsin. Infection is said to have been introduced from Hong-Kong. During four months the human plague mortality approximated 1,000 (Wu Lien Teh). Infection did not persist and Tongshan has since remained plague-free, this town also escaping completely the pneumonic plague outbreaks of 1911 and 1921.)

Pneumonic Plague.

Space does not permit of any detailed description of the last two severe pneumonic plague outbreaks in Manchuria, but the following brief summary of events may be of interest.

The two outbreaks of 1910-1911 and 1920-1921 had several features in common, though the latter was responsible for only 9,000 deaths, as compared with the 60,000 deaths that occurred in the 1910-1911 outbreak.

In both epidemics, infection invaded Manchuria, in the month of September, from the Trans-Baikal provinces of Siberia through Manchouli, a frontier station on the Chinese Eastern Railway. The 1910-1911 outbreak spread along the lines of railway as far south as Dairen, where 66 deaths were reported, and even to the Shangtung Peninsula. Four hundred deaths were reported from Chefoo and 450 from Tsinanfu.

In 1920-1921 the public health authorities were much better prepared to deal with the epidemic and to this fact must be attributed the relatively mild nature of the outbreak. The North Manchurian Plague Prevention Service and the health organisations of the South Manchurian and Chinese Eastern Railways, co-operated in remarkably successful attempts to circumscribe the outbreak. The four towns Manchouli, Dalinor, Tsitsikar, and Harbin, all situated on the Manchouli-Harbin section of the Chinese Eastern Railway, were responsible for 7,000 of the 9,000 deaths, the estimated total mortality ascribed to the outbreak.

In 1920-1921 there were only 77 deaths reported from Changchun, the northernmost station on the South Manchurian Railway, as compared with 5,000 in the 1910-1911 outbreak; only a few odd cases occurred south of Changchun. The deaths in Mukden numbered only four, as compared with 4,500 in the previous outbreak. Isolated epidemics were reported at Koupangtzu (18 deaths), the junction where the Newchwang branch line joins the Peking-Mukden railway line, and in Shangtung and Chihli (200 deaths). These outbreaks were quickly under control.

In 1921 two steamers from Vladivostock arrived in Chefoo infected with pneumonic plague the last one as late as June 1921. The passengers were isolated at Kentucky Island and the outbreak was quickly suppressed.

In June 1922, another steamer from Vladivostock arrived at Tsingtau with a case of pneumonic plague on board. The patient infected his mother, but there were no other cases.

The town and port of Vladivostock suffered somewhat severely during the outbreak of 1921 in spite of stringent precautions taken by the Russian authorities. This town escaped altogether

ıe 1910-1911 outbreak. The first case of plague noted in Vladivostock was on April 9th, and ifection persisted right through the hot weather, the last case being reported in October. The ıtal number of deaths for which pneumonic plague was responsible in Vladivostock in 1921 was 17. Two cases of bubonic plague were also reported, one on July 10th and the other on August 9th. Moreover, five plague-infected rats were found in July and two in August. These facts 're of interest, as this is the only instance in which the disease assumed a bubonic form during the ıeumonic plague outbreak of Manchuria and adjacent territory in 1920-1921. It seems probable ıat the bubonic cases originated from the introduction of rat-plague infection from overseas. he persistence of pneumonic plague through the hot-weather months is a fact of great interest.

The significance of the epidemiological facts mentioned above and the bearing they have on ır present conceptions of plague epidemiology have been discussed in an earlier chapter of this ;port.

The North Manchurian Plague Prevention Service.

The North Manchurian Plague Prevention Service was established by the Chinese Govern- ıent in 1912 as the outcome of the severe epidemic of pneumonic plague of the previous year, nd is financed from the customs revenue. At the present time it has at its command six hos- itals at Harbin, Manchouli, Taheiho, Lahasusu, Sansing, and at the quarantine station of the ort of Newchwang (Yingkou). The location of the above hospitals was determined chiefly by ɔnsiderations of plague prevention.

The headquarters of the service is in Harbin, where there is a well-equipped laboratory, a nall modern general hospital, and a series of buildings designed for use as infectious disease wards ı case of need. These buildings were of the utmost value during the cholera epidemic of 1919 nd plague epidemic of 1920-1921.

Pneumonic Plague Prevention Campaign of 1920-1921.

It would be going too far from the subject-matter proper of this report were any detailed ;ference made to the magnificent work done by the North Manchurian Plague Prevention Ser- ice, in co-operation with the Russian medical personnel of the Chinese Eastern Railway, in their nti-plague campaign of 1920-1921. The combined measures taken by the medical authorities f the South Manchurian Railway Company, in co-operation with the North Manchurian Plague revention Service, to prevent the spread of infection farther south are, however, of immediate ıterest to the present inquiry. That these measures were so successful is due in large measure ɔ the cordial and hearty co-operation between the Chinese and Japanese medical authorities ɔncerned.

The northernmost station of the South Manchurian Railway Company is Changchun, which es a short distance south of Kwangchengtzu (the southernmost station of the Chinese Eastern 'ailway line to Harbin), with which it is connected by rail. Detention barracks and houses were pened at both Changchun and Kwangchengtzu, the former having accommodation for 1,300 per- ɔns, and the latter for about 1,000. These quarantine camps were administered by Japanese nd Chinese medical officers respectively. In addition, two buildings, capable of accommodating 00 contacts, were opened inside the Chinese city of Changchun. All people arriving from Harbin r other infected places during the course of the epidemic were detained in one or other of these laces for five days. The total number of people detained in these quarantine stations was about 3,500, amongst whom 39 cases of pneumonic plague occurred. The railway traffic between Harbin and Changchun was carefully controlled throughout the epidemic, and the number of ckets issued was strictly limited. Subsidiary quarantine stations were opened on the Harbin- hangchun section of the line, the most important oft hem being at Yaomen, between which station nd Kwangchengtzu no passenger was allowed to alight. Thirteen cases of plague occurred among he passengers detained in the quarantine station at Yaomen. Between January and June, four lague cases were discovered during the medical inspection of trains in transit. Such inspections ?ere consistently and constantly carried out on the southern section of the Chinese Eastern Railway nd on the South Manchurian Railway from January to June 1921.

The detection and detention of 52 persons infected with pneumonic plague who were endea- ouring to travel south, and the absence of any serious outbreak south of Changchun, are eloquent estimony to the efficiency of the measures taken to control the outbreak.

The above facts indicate that, given a well-equipped organisation and real co-operation etween all authorities concerned, pneumonic plague outbreaks are not difficult to control, and hat the anti-plague organisations in Manchuria in 1921 successfully carried out a work of very reat international importance.

XV — KWANGTUNG LEASED TERRITORY AND THE SOUTH MANCHURIAN RAILWAY COMPANY

Medical and Public Health Work.

The Kwangtung Leased Territory, 1,300 square miles in extent, situated at the extreme south of the Liao-Tung Peninsula, came under Japanese jurisdiction on the conclusion of the Russo-Japanese War in 1905. At the same time the South Manchurian Railway line from Changchun to Dairen, and the branch-line from Mukden to Antung, together with other branch-lines, passed into Japanese possession. In addition to the permanent way, the railway company has a certain amount of leased territory at all the more important railway centres, territory aggregating nearly 100 square miles. All civil administration in the Kwangtung Leased Territory is under Japanese jurisdiction, as are the police and postal services in the railway zone.

The headquarters of the civil administration of the Kwangtung Leased Territory is at Port Arthur. The headquarters of the South Manchurian Railway Company is at Dairen.

The Central Sanitary Bureau of the Kwangtung Leased Territory is a section of the police department of the central administration at Port Arthur. Public health work of the railway company is administered from the head office of the company at Dairen. Port health administration, port quarantine, etc., are looked after by the Marine Bureau of the Kwangtung Government at Dairen.

Railway medical officers of health are stationed at Antung, Fushan, Changchun, Mukden, and Tashihchiao.

Hospitals are of two kinds : those belonging to the Kwangtung Government and those belonging to the railway company. In the former category are the large general hospital and the isolation hospital at Port Arthur, and the epidemic hospital at Dairen with accommodation for 160 patients.

The South Manchurian Railway Company has hospitals at the following places : Dairen, Shahokou, Wafangtien, Tashihchiao, Yingkou, Anshan, Liaoya, Mukden, Tiehling, Kaiyuan, Ssupingkai, Kungchuling, Kirin, Fushun, Penchilu, and Antung. Of these hospitals, those at Dairen, Mukden, and Fushun are the best.

The hospital at Dairen is very completely equipped and admirable work is being done. Its design, however, is not convenient, and the hospital is shortly to be replaced by new buildings now in course of erection. In the new hospital there will be accommodation for some 600 patients; the plans are admirable.

The Mukden hospital is worked in conjunction with the South Manchurian Medical College. This medical college is well-housed and very well equipped. There are at the present time upwards of 200 medical students, one-third being Chinese, the remainder Japanese. The hospital is in every way adequate without being luxurious. There is a large out-patient department, good special departments and accommodation for about 360 in-patients, of which nearly 100 beds are reserved for infectious diseases (other than cholera and plague).

The number of doctors in the hospital service of the South Manchurian Railway is 213, and the combined capacity of their hospitals amounts to 2,269 beds.

At Mukden, Changchun, and Antung, there are quarantine stations belonging to the Railway Company, each capable of accommodating 1,600 persons.

There are waterworks at all the more important railway towns.

The combined population of the Kwangtung Leased Territory and the South Manchurian Railway zone amounted in 1921 to 907,549. Of this number, 191,795 were Japanese, 715,221 were Chinese, and 533 foreigners.

In the Kwangtung Leased Territory, the death-rates per 1,000 for the Japanese population during the five years 1917 to 1921 were as follows : 23.1, 22.5, 25.7, 20.1, and 16.8. The corresponding figures for the Chinese population were 25.9, 27.6, 23.4, 18.2 and 17.8. For the Japanese population in the South Manchurian Railway Zone, the death-rates for these five years were 20.6, 19.1, 25.6, 19.1 and 17.8.

Infectious Diseases.

The relative frequency of infectious diseases in Manchuria can be deduced from the following table, which details the number of cases and deaths ascribed to each of such diseases during 1921 among the Japanese population in the Kwangtung Leased Territory and the South Manchurian Railway Zone respectively.

Kwangtung Leased Territory.

Typhoid Fever		Para-typhoid		Dysentery		Cholera		Smallpox		Plague		Diphtheria		Scarlet Fever		Typhus		C.-S. Meningitis		R. Fever	
C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
377	41	117	5	285	16	0	0	368	52	0	0	80	8	154	16	11	0	16	11	7	0

South Manchurian Railway Zone.

447	46	79	2	443	39	0	0	135	22	0	0	33	6	173	37	22	1	2	2	2	0

TOTAL { Kwangtung Leased Territory : 1,415 cases, 149 deaths.
South Manchurian Rail Zone : 1,336 cases, 155 deaths.

Typhoid fever is said to be less prevalent than it was some ten years ago, the improvement being ascribed to vaccination and sanitary improvements generally.

Dysentery is more prevalent in Fushan, the coalmining centre, than elsewhere.

Scarlet fever is said to have been unknown in Manchuria prior to the year 1908. It is now a comparatively common disease. Its case mortality rate is considerably lower than it was a few years ago and much lower than it is in China at the present time.

Smallpox is a very common disease prevalent throughout the country, so common that it is not regarded as a quarantinable disease by the port health procedure of Dairen.

Typhus fever and relapsing fever are not commonly met with except among the coolie population working in the mines at Fushan. Here outbreaks are by no means uncommon. The Japanese population have suffered very little from these diseases. The case mortality rate is very low.

The influenza epidemic of 1918 was widespread in Manchuria. In the autumn months of that year it is estimated that the cases numbered 65,000 and deaths approximated 1,000. These figures indicate a much lower case mortality rate than was experienced in certain other parts of Asia.

Cholera makes its appearance in epidemic form from time to time, but the disease does not appear to be endemic in Manchuria, nor are severe epidemics of very frequent occurrence. The Kwangtung Leased Territory suffered from localised epidemics in 1907, 1909, 1910, and 1911, one of them being very severe. In 1912, five cases were found on ships in Dairen harbour, otherwise the year 1912 was free from the disease, as were the six succeeding years. In July 1919, the year of very widespread cholera incidence throughout the East, infection was introduced into Yingkou (Newchwang) and spread rapidly. The subsequent epidemic is estimated to have caused 13,000 cases and 6,300 deaths.

In July the following year, cholera infection was once more imported into Manchuria through Yingkou. The infected boat had come from Tientsin. The ensuing epidemic was more localised than its predecessor and was soon under control.

THE PORT AND TOWN OF DAIREN.

The port of Dairen is situated at the south- east extremity of the Liao-Tung Peninsula. The town faces north, being built along the southern shore of a deep bay, and is backed by a range of hills.

Dairen is now a flourishing modern town and an important up-to-date port; both town and port have been constructed within the last 25 years or so. The bay forms a very fine harbour, which is practically ice-free all the year round, and is in fact the only port of Manchuria which is not frozen up in winter. The water in Dairen Bay occasionally freezes, but never to such an extent as to make it difficult for a vessel to come alongside the wharves.

The modern town of Dairen is extremely well-laid out. The roads are excellent and there are numerous very fine buildings. In 1921 the population numbered 220,180, of whom 65,326 were Japanese.

Dairen is the headquarters of the South Manchurian Railway Company, and it is to the enterprise of this company that the phenomenal development of the port and town is due. Before the Russo-Japanese war, the Russian Government had commenced harbour constructional work, but little progress had been made when the port came under Japanese jurisdiction as the result of the Treaty of Portsmouth, 1905.

The inner harbour is protected by a breakwater 2½ miles long enclosing an area of 800 acres. There are three fine piers in existence, and a fourth is under construction. At low tide there is a depth of 30 feet alongside the wharves. The total wharf accommodation is nearly 2½ miles in length.

An excellent water supply is laid on to each wharf, and three water boats are available for shipping at anchor.

About 70 admirably constructed store-sheds and godowns have been built, and on the piers and wharves are rails which connect them with the railway system of the South Manchurian Railway.

It is doubtful whether any port in the East is equipped better than, or as well as, is Dairen to meet the demands made upon it.

Outside the inner harbour to the east of the town there is a large and extremely well-equipped quarantine station, with accommodation for 108 first- and second-class cabin passengers, 200 third-

class passengers, and 200 deck passengers; bathing and disinfecting plant, hospitals and labora tories. The bathing accommodation is sufficient for 288 persons at a time. The hospital contain sixteen beds, capable of increase. There are sheds attached for the segregation of cattle. Th whole station covers an area of 120,000 square yards. The only adverse criticism that could b levelled against this quarantine station is that it is somewhat too luxurious, elaborate, and costl for the purpose for which it is intended. Quarantine stations are not very frequently in use.

The trade of Dairen has increased in a remarkable manner. In 1921 the gross tonnage o vessels berthed was 5,697,784 : exports and imports amounted to over 4,000,000 tons.

Brief reference has already been made to the General Hospital at Dairen and the Infectiou Diseases Hospital. The latter is provided with excellent laboratory accommodation.

Dairen at present possesses no special apparatus for the fumigation of ships.

Port Health Regulations.

Vessels having, or which have had, a case or cases of cholera, smallpox, scarlet fever or plagu on board, or which have sailed from, or touched at, an infected port, or which have communicate with an infected ship must fly the quarantine flag. Medical inspection of any ship may be carrie out if the harbour authorities consider this necessary. Infected vessels are disinfected and rat destroyed on board should such a procedure be deemed necessary by the harbour authority. Th passengers and crew may likewise be quarantined, either on board the ship or at the quarantin station, for definite periods—ten days for plague, five days for cholera—counted from the dat of departure from the infected port if there be no infection on board ship.

"Notice of arrival" forms, which the master and surgeon of a ship are called upon to sign give detailed information regarding the medical history of the ship during the voyage, includin information regarding dead rats that may have been found, and the nature and source of th cargo. The bill of health form issued is of the simplest description, merely certifying that ther is, or there is not, disease of an infectious nature prevalent in the port of Dairen and that th state of health of the ship, to which the bill is given, is satisfactory or the reverse.

XVI — NEWCHWANG (YINGKOU)

The town and port of Newchwang lies on the left bank of the Liao-Ho River, some 14 miles above its mouth where it flows into the Gulf of Pechihli. Before the development of Dairen, Newchwang was the most important port of Manchuria; its trade is still very considerable. The Liao-Ho River flows through some of the most fertile districts of Manchuria, and as about 50 miles of the river and its tributaries are navigable for junks, the trade of Newchwang is likely to be important for many years to come. For about three months each year the river at Newchwang is frozen. The bar at the river mouth has silted up somewhat of recent years, but steamers of considerable size can still reach the port.

Newchwang extends for some three miles along the low-lying southern bank of the river. Here the river is from 600 to 1,000 yards across, and is frequently crowded with river and sea-going junks. About 20 steamers were in the river at the time of our visit.

The town consists of two portions : a small Japanese town to the east which contains the terminus of a branch line of the South Manchurian Railway. This Japanese settlement is not so important as formerly; it now contains a Japanese population of about 3,000. There is an excellent and well-equipped general hospital, owned and administered by the South Manchurian Railway Company, with accommodation for 50 in-patients, good out-patient and special departments, and 30 beds for infectious diseases.

The old Chinese town lies immediately to the west of the Japanese settlement. It has grown in past years regardless of any plan or design, its roads are abominable. It has a population of between 50,000 and 60,000. The custom-house and port offices are in the eastern half of the old town on the river bank.

The most important articles of export from Newchwang are soya-beans and soya-bean products. There are numerous mills in the town for the preparation of bean oil and bean cake.

A new quarantine station hospital, administered and supervised by the North Manchurian Plague Prevention Service, has recently been installed on the river bank on the extreme western side of the old town. The hospital, though small, is excellent, and there is a sufficiently equipped bacteriological laboratory. The buildings of the quarantine station have not yet been commenced. At present temporary barracks on the other side of the river are available for the isolation of "contacts" in case of need. Opposite the new quarantine hospital on the right bank of the river is the terminus of the branch railway line which connects with the Peking-Mukden line at Koupangtzu, 56 miles distant.

In the old Chinese town there is a missionary General Hospital with accommodation for some 60 patients. This hospital, though not luxurious, is adequately equipped and is doing most excellent work. The medical superintendent of this hospital is in charge of the port health work.

As in other Chinese ports, port health administration is supervised by the commissioner of customs.

The quarantine regulations are somewhat similar to those of Shanghai. They take cognisance of cholera, typhus fever, yellow fever, plague, smallpox, scarlet fever, or "any other infectious disease". An infected vessel is one that has on board, or which has had on board within 10 days of her arrival, a case or cases of any of the above diseases. A suspected vessel is one which has come from an infected port, or which has called at an infected port within a period of 10 days of her arrival at Newchwang. Such vessels harbour at the quarantine anchorage. Ports are declared to be infected by the superintendent of customs in agreement with the board of Treaty-Power consuls, who may also authorise any further precautions deemed necessary in times of threatened epidemics. The average incidence of three cases per day throughout any week of any of the above-mentioned diseases warrants a port being declared infected. Vessels from a port infected with pneumonic plague are not admitted to pratique until seven days have elapsed since their departure from pneumonic-plague-infected ports. Vessels from bubonic-plague-infected ports anchor in the stream and discharge and ship cargo by means of cargo-boats using rat-guards on the lines by which such cargo-boats are made fast. If, however, such a boat possesses a certificate of fumigation, stating that the boat has been fumigated in freight since taking on the cargo, it is allowed to lie alongside a wharf, subject to the usual precautions for preventing communication between ship and shore rats. The regulations contain restrictions prohibiting the import of specified dangerous goods from plague-infected or cholera-infected ports.

No vital statistics for the civil population of Newchwang are available, nor is it possible to obtain statistical information regarding the incidence of infectious disease.

When writing about the prevalence of such diseases in Manchuria as a whole, reference was made to two occasions on which Newchwang acted as the port of entry for cholera infection. When writing of plague, attention was directed to the interesting fact that, though Newchwang was infected with bubonic plague in 1898 and remained infected till 1906, with a marked rat mortality, the town has remained plague-free from 1906 till the present time, escaping entirely the severe Manchurian plague epidemics of 1911 and 1920. The significance of these matters has been discussed in Chapter II of this report.

XVII — THE PHILIPPINE ISLANDS.

The Philippine Islands are the northern group of the Asiatic archipelago extending from 4° 40′ to 21° 10′ north latitude and from 116°40′ to 126° 34′ east longitude. They are thus entirely within the tropics.

The Philippine Islands are said to comprise 7,083 islands, of which 2,441 are named. The total area of the islands approximates 115,000 sq. miles, and the length of the combined coast-lines is more than double that of the United States of America.

The two largest islands are Luzon and Mindanao, the first at the northern, the latter at the southern end of the group : the areas of these two islands amount to 40,814 and 39,906 sq. miles respectively. Each of nine other islands has an area exceding 1,000 but less than 10,000 sq. miles. The combined area of the remaining islands is thus 6,628 sq. miles : of these, 463 islands have each an area of not less than 1 sq. mile. Nearly all the islands are mountainous and well-wooded.

Luzon is the largest, wealthiest and most extensively populated island of the Philippines. Manila, the capital of the Philippine Islands, is situated on the west coast of Luzon at the head of Manila Bay.

The time available did not permit of an extension of the tour in the Philippine Islands beyond Manila and its environs.

Climate.

The Philippine Islands have a tropical climate, but there are places at a high elevation where cool temperatures can be enjoyed. Sea breezes are responsible for the fact that the climate of the islands is on the whole much less trying and enervating than their geographical position would lead one to expect. In Manila the mean maximum air temperature approximates 89° Fahrenheit and the mean minimum temperature 72° F. Shade temperatures as high as 100° F. are very rarely recorded. The mean relative humidity is about 80 per cent and the mean annual rainfall is 2,453 m.m.

The variations in climate experienced in the Philippine Islands are dependent largely on distribution of rainfall. Those parts of the islands which are accessible to water-charged currents from the Pacific Ocean are the most humid; in such places there is no dry season, but the rainfall is somewhat heavier between the months of November and February inclusive than at other times of the year. The average annual rainfall at such places amounts to 2,766 m.m. The areas which are not readily accessible to water-charged currents from the Pacific have an average rainfall of 2,453 m.m. and have more or less well-defined wet and dry seasons, the former extending from June to October and the latter from December to March. Though reference has been made to "seasons", it must be remembered that well-marked seasons such as are experienced in more temperate latitudes are unknown in the Philippine Islands.

Population.

The total population of the Philippine Islands in 1920 amounted to 10,455,180—91 persons to the square mile. In 1903 it was only 7,415,498. The density of the population is as high as 21,000 to the square mile in the city of Manila; in the provinces the density varies between 469 in Cebu and 11 in Agusan. The sexes are fairly equally balanced, males being in very slight excess. More than 90 per cent of the population are Christians.

The Filipinos are of Malay descent; traces of both Spanish and Chinese ancestry are, however, observable in the upper classes of the population of Manila. There is no language common to all the islands of the group; as a matter of fact, 40 fairly distinct languages are in use in the islands and upwards of 300 dialects.

The population is chiefly devoted to agricultural and fishing pursuits. Returns for 1918 regarding occupation were as follows :

Agricultural labourers	2,601,000
"Professional"	685,000
Domestic services	518,000
Commerce	426,000
"Industrial pursuits"	865,000

Agriculture.

The area under cultivation approximates 11,500 square miles, or 10 per cent of the total area of the Philippines. In 1920-1921 the areas devoted to certain of the more important crops were as follows : 1,673,000 hectares to rice; 241,000 hectares to sugar-cane; 91,000 hectares to tobacco; 418,000 hectares to coconuts, and 560,000 hectares to *abacá*. *Abacá* is Manila hemp, *Musa textilis*, the most important crop grown, from a commercial point of view.

Forests cover an area of no less than 675,000 square miles : in 1921 the timber cut from these orests amounted to 656,236 cub. metres and the collection of other forest products constitutes an nportant industry.

Administration.

For administrative purposes the Philippine Islands are divided into 48 provinces or prefec- ures and the city of Manila. The government of the islands is vested in the Governor-General, ho is appointed by the President of the United States of America, and the Philippine Senate nd the Philippine House of Representatives, which are both elected bodies. The seat of the cen- al government is at Manila. There are six executive government departments :

1. The Department of Interior.
2. The Department of Public Instruction.
3. The Department of Finance.
4. The Department of Justice.
5. The Department of Agriculture and Natural Resources.
6. The Department of Commerce and Communications.

Each department is in charge of a departmental secretary subject to the general supervi- on and control of the Governor-General.

The vast majority of government officials are Filipinos. During the last decade the whole achinery of government has been transferred to a very large extent to the inhabitants of the lands.

Medical and Sanitary Administration.

The Philippine Health Service is under the control of a special bureau of the Department Public Instruction. The head of this bureau is termed the Director of Health. The bureau subdivided into nine divisions, dealing with administration; property; statistics; hospitals; mmunicable diseases; sanitary engineering; public health of the city of Manila; public health of ie provinces; and public health of Mindanao and Sulu. (Mindanao and Sulu comprise the uthernmost islands of the Philippines and differ in respect of population, state of development, ligion and other matters from the other islands of the group.)

There is a council of hygiene to assist the Director of Health in the discharge of his duties. his council consists of a professor of the College of Medicine and Surgery of the Philippine Uni- rsity; a professor of the Medical Faculty of the Santo Tomas University; a member of the llegio Medico Farmaceutico; a member of the Philippine Medical Association; a senior member the Philippine Health Service; an attorney-at-law and one member who is an owner of real operty in the Philippines. All the members of this council are appointed by the Governor- eneral.

The medical members of the Philippine Health Service are commissioned officers and are four grades :

	No. in 1921
1. Senior medical inspector	12
2. Medical inspector	19
3. Senior surgeon	14
4. Surgeon	16

addition, there were, in 1921, 27 assistant surgeons.

In the provinces there are 48 health districts and 4 sub-districts, in charge of which there are the present time 49 district health officers. The health districts are subdivided into sanitary visions, of which there are 292 in the provinces. Each provincial sanitary division should have medical "president". At the present time 198 doctors and 42 nurses are acting as presidents sanitary divisions. These doctors are part-time health officials receiving a subsidy from Govern- ent for the public health work which they undertake.

Sanitary inspectors are appointed to assist the district health officer in the discharge of his uties. Some of these men are at present being trained by the district health officers; others are ained in a sanitary inspectors school which has been opened in Manila during recent years. this school, accepted candidates are put through a six-months course. There are 990 sanitary ispectors on the provincial rolls.

District health nurses, trained in Manila, are doing most useful work in several provinces; ese number at present 65.

District health officers are responsible for the registration of births and deaths, as well as the gistration of cases of infectious disease that occur within their districts. In the offices of the nitary inspectors in villages, clerks are employed who do the actual registration. It is impossible bury, or otherwise dispose of, a body without a burial certificate. All cemeteries are under e direction of the Health Authorities, and all are licensed. The returns from the burial-ground e thus a very valuable check on death registration. The registration of births is likewise compul- ry, and appears to be carried out efficiently in the Philippines, where it presents fewer difficulties an it does in non-Christian Oriental countries. Practically all the children who survive the st few days of life are baptized. The Church records are available to check the accuracy of e civil registration.

It can be stated, then, that the figures representing births and deaths are a reasonably close proximation to the truth, but it is otherwise with regard to the cause of death. The number people who receive skilled medical attention during their last illnesses does not exceed fifteen

per cent of the total of those who die, and this proportion is very much less in remote areas In the majority of cases, therefore, the diagnosis is made after death, as the result of enquiry from the deceased's relatives and friends regarding the symptoms displayed during the last illness the duration of illness, etc.

Births and Birth-rates.

In 1921 the number of births recorded in the provinces of the Philippine Islands was 325,000, which is equivalent to a birth-rate of 37.46 per thousand; for Mindanao and Sulu the rate was 27.90 per thousand. The registered number of male births is in very considerable excess of the number of female births. In 1921 the sex ratio of births was 113 to 100. This disproportion appears to indicate a deficiency in female birth registration, which is characteristic of most Oriental countries.

Deaths.

Below are given in tabular form the total deaths recorded, with the equivalent death-rates, for the whole of the Philippine Islands during each of nine recent years :

Year	Total deaths	Death-rates
1913	154,086	16.82
1914	163,943	17.57
1915	176,313	18.55
1916	195,970	20.04
1917	212,334	21.10
1918	367,106	35.47
1919	316,677	29.98
1920	203,693	21.23
1921	203,338	21.22

The above figures indicate progressive increased mortality during the last decade. The very high mortality rate recorded in 1918 was due in large part to the influenza epidemic, the effect of which is still discernible in the vital statistics of the Philippine Islands. But even prior to 1918 there was a decided tendency to increased mortality, the reasons for which are not very obvious. It does not appear that increasing efficiency in the registration of deaths can explain the increase.

Causes of Death.

In the following table is set out the number of deaths ascribed in 1921 to some important causes of mortality, with the death-rates per 100,000 of population and the average rate for 1916 to 1920.

Disease	Deaths in 1921	Death-rate per 100,000 1921	Average death-rate 1916-1920
Malaria	26,199	293.42	346.24
Pulmonary tuberculosis	22,478	251.75	254.40
Other forms of tuberculosis	1,372	15.36	—
Smallpox	128	1.43	159.13
Influenza	1,944	21.77	118.56
Amœbic dysentery	4,746	53.15	113.20
Bacillary dysentery	4,121	46.15	
Cholera	30	0.33	87.96
Typhoid fever	2,070	23.18	35.72
Whooping-cough	1,863	20.86	21.51
Pneumonia	1,422	15.92	12.71
Measles	3,053	34.19	8.78
Cerebro-spinal meningitis	80	0.89	2.67
Diphtheria	45	0.50	0.98

It will be noted that here, as elsewhere in the tropical countries of the East, malaria is accredited with more deaths than any other single disease, and here as elsewhere it is probable that the term "malaria" includes other febrile conditions.

The diseases of chief importance from the point of view of the present enquiry, namely cholera, smallpox and plague, will be considered at greater length.

Cholera.

In the following table is set out the number of cases of, and deaths from, cholera recorded during each quarter of the years 1914 to 1922 inclusive. The figures relate to the province only, excluding Manila, which is reserved for subsequent consideration.

Year	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1914	519	392	0	0	986	674	1,455	1,041	2,960	2,10
1915	286	210	510	94	475	328	215	144	1,488	77
1916	458	340	572	378	5,320	3,426	5,283	3,329	11,633	7,47
1917	2,749	1,824	2,530	1,466	4,714	2,788	2,934	1,805	12,927	7,88
1918	1,300	1,013	574	321	1,383	851	3,043	2,394	6,300	4,57
1919	1,243	922	2,148	1,477	17,926	12,612	4,273	3,004	25,590	18,01
1920	1,349	986	296	231	207	154	18	13	1,870	1,38
1921	8	3	24	9	11	5	64	36	107	5
1922	28	19	45	32	17	13	1	1	91	6

It will be noted that no year of the series has been free from cholera, though the years 1921 nd 1922 were characterised by an extremely low incidence of the disease in the Philippine Islands, s in neighbouring countries of the Far East. The year 1919 was characterised here as elsewhere y much the most severe outbreak of recent years.

Considerable attention has been paid to anti-cholera vaccination. At the present time single injection is usually given. The number of persons vaccinated in 1921 in the Philippine slands was 399,170. No statistics are available to indicate the degree and duration of the immu- ity conferred by such vaccination.

Smallpox.

The number of cases and deaths that have been ascribed to smallpox during each quarter f the past nine years in the provinces of the Philippines (excluding Manila) is as follows :

Year	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
914. . . .	—	156	—	118	—	123	—	41	—	438
915. . . .	—	62	—	106	—	72	—	33	—	273
916. . . .	—	62	—	58	—	73	—	57	—	250
917. . . .	—	44	—	75	—	98	—	171	—	388
918. . . .	359	249	6,443	2,810	12,075	5,543	14,212	6,556	33,089	15,158
919. . . .	44,998	21,724	27,843	15,344	13,882	8,991	5,945	3,857	92,668	49,915
920. . . .	4,238	2,116	3,443	2,173	1,986	1,471	745	867	10,412	6,627
921. . . .	201	509	95	103	27	73	13	43	336	728
922. . . .	119	12	0	0	4	0	2	0	125	12

The greatly increased incidence of the disease during the years 1918, 1919 and 1920 is note- worthy. The outbreak of 1919, which was responsible for 92,668 cases and 49,915 deaths, was nuch the most severe outbreak experienced since the American occupation of the Philippine slands. Approximately 90 per cent of the fatal cases are said to have occurred among nvaccinated children.

Over and above the cases and deaths recorded in the above table, a certain number of cases nd deaths are attributed each year to "varioloid", some of which perhaps should be included n the smallpox returns.

Since the outbreak of 1918, vaccination has been more energetically carried out than it was n the years immediately preceding that outbreak. In 1919, six special vaccinating parties were ormed, each consisting of a chief and 20 vaccinators. These parties were engaged in carrying ut intensive and systematic vaccination in parts of the islands which suffered most from smallpox. In 1920, the strength of these parties was reduced to 10 vaccinators each. The number of vacci- nations performed during each year of the last decade is as follows :

Year	Number of Vaccinations
1913.	1,523,769
1914.	1,635,857
1915.	1,265,107
1916.	839,363
1917.	817,170
1918.	3,877,969
1919.	7,976,528
1920.	3,811,898
1921.	2,491,025
1922.	2,112,589
	26,351,275

Plague in the Philippine Islands has been practically confined to Manila.

MANILA.

Manila is the capital of the Philippine Islands. The town and port are situated on low-lying ground on the shores of the Bay of Manila. Manila Bay, some 40 to 50 miles across, with an inlet from the sea about 12 miles broad, is a well-marked physical feature in the southern portion of the west coast of Luzon, the largest of the Philippine Islands. The swampy ground on which Manila was originally built is intersected by the River Pasig, which empties its waters into the bay and by numerous creeks.

The town covers an area of approximately 20 square miles. South of the mouth of the river is the old walled city, Intramuros. The walls of this old town are 2 1/2 miles long and about 25 feet high. The town was built in 1590. It was formerly surrounded by a moat, which has been filled in since the American occupation at the end of the last century. This walled-in city, with its numerous churches and centuries-old buildings, is reminiscent of a Spanish town. Two fine bridges give access to the chief shopping and commercial district of the town, which lies imme- diately north of the mouth of the Pasig River. Here there is the old customs-house and many commercial and shipping offices, storehouses and granaries. A little farther north is the most

crowded quarter of Manila, in which conditions, though vastly improved, are still open to criticism from a public health point of view. The residential quarters of Manila lie for the most part south of the walled-in city, extending along the shores of Manila Bay. Here the Luneta and other large open spaces form attractive pleasure grounds for the inhabitants of the city.

In the town the better-class native dwellings are usually two storeys high, the upper storeys alone being used for residential purposes. All round the outskirts of the town the native dwellings are constructed of bamboo and nipa-palm and are raised on bamboo poles in the manner which is characteristic of most parts of the Philippines.

Manila is a great hemp market, and exports annually quantities approximating 150,000 tons. About half the total hemp exported goes to the United States. Sugar, copra, and tobacco are also exported in large amount.

Though Manila Bay is well enclosed and protected on the seaward side by the Mariveles Mountains, its huge size renders it liable to storms. It was necessary therefore to construct a protected harbour. Two long breakwaters now enclose an area of water of approximately 350 acres, which has been dredged to a depth of 30 feet. A large reclamation in the near vicinity forms the port area of Manila. Here there are two large wharves, alongside which ocean-going vessels can be accommodated. These wharves are roofed over. A third wharf is being constructed. The stores and godowns in the near vicinity of these wharves are well built and designed. The advantages from a health point of view of having the port area separated by a large open space from the nearest congested areas of the town are obvious.

The Pasig River is navigable to small steam craft and the flotillas of lighters and barges that are always to be seen are evidence of the importance of this river from a commercial point of view.

Population.

The population of Manila, according to the census of 1918, was 285,306. It was made up as follows :

Americans	3,134
Filipinos	259,049
Spaniards	1,955
Other Europeans	1,126
Chinese	17,856
Others	2,186

For purposes of health administration, Manila is divided into seven health districts. Each of these has a Health Station, in charge of which there is a medical officer, assisted by a chief sanitary inspector. Under the latter official a varying number of sanitary inspectors are employed. These sanitary inspectors are engaged in house-to-house visiting, and are responsible for seeing that the sanitary laws and regulations, building by-laws, etc., are duly observed.

In addition to the above, all the policemen of Manila undergo the six months' course of training for sanitary inspectors.

Each of the Health Stations has an out-patient dispensary at which the sick poor can receive free treatment. At the Stations births are registered and death certificates are issued. These records are sent to the Central Health Office, where they can be compared with certificates of burial received from the cemeteries and the church records of baptisms. As elsewhere in the Philippine Islands, the burial-places are under the jurisdiction of the health authorities.

The births and deaths, with the corresponding birth-rates and death-rates, that have been registered in Manila city during each of the past six years are given below :

Year	Number of births	Birth-rate	Number of deaths	Death-rate per 1,000 of population
1916	9,082	33.02	7,165	31.34
1917	8,883	31.82	6,682	28.70
1918	9,083	32.06	12,369	50.93
1919	10,029	34.89	7,814	32.12
1920	12,614	43.27	7,667	30.07
1921	12,261	41.47	7,537	31.02

The constant increase in the birth-rate is remarkable.

With regard to death-rates, the influence of the influenza epidemic of 1918 is well shown in the above table (1).

Infant mortality rates are high, but do not compare unfavourably with those of other Oriental towns. In 1921, the deaths of infants under one year of age were equivalent to 205.5 per thousand births, as compared with 213 and 225 in the two years immediately preceding.

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(1) The death-rates quoted are estimated on the total deaths that were registered in Manila, including the deaths of "transients". In the Reports of the Philippine Health Service the death-rates discussed are apparently based on figures obtained by deducting all deaths of transients from the total mortality, but no correction is made, nor would it be possible, on account of residents of Manila dying elsewhere. In the circumstances the rates given above appear to afford the best indication of health conditions prevailing in the city.

Below is given in tabular form the number of deaths attributed to each of the more important communicable diseases in Manila during each of the past 18 years :

Deaths from several Communicable Diseases in Manila.

	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
lid fe-																		
e. . .	105	101	47	77	116	90	82	63	55	86	136	125	130	216	224	216	290	296
ox. .	29	2	5	1	122	25	—	—	—	—	—	—	1	2	989	55	5	0
s. . .	2	1	—	2	3	1	—	2	22	—	1	4	6	2	16	3	12	10
heria																		
roup.	4	7	8	11	9	—	10	17	16	7	15	23	30	27	14	22	17	22
iza. .	0		—	—	—	14	38	33	20	9	17	12	9	15	445	45	41	51
a. . .	8	226	744	194	819	227	224	1	—	110	272	44	513	8	137	408	3	23
ery .	337	350	363	313	419	235	156	281	264	146	121	129	164	312	759	443	294	173
. . .	79	43	7	—	—	—	—	—	42	16	22	—	—	—	—	—	1	0
culo-																		
s . .	1,260	1,315	1,452	1,150	1,302	1,297	1,352	1,451	1,442	1,303	1,293	1,427	1,546	1,637	2,264	1,829	1,830	1,709

Before considering the incidence of plague, cholera and smallpox in Manila at some length, iew of the other diseases in the table call for brief notice.

Typhoid fever has been more in evidence during the last decade than it was in the previous 1 year period. The reasons for this are not obvious; were general sanitary conditions responsible f the increase one would expect to find a similar rise in the dysentery mortality curve. This s not apparent.

Though diphtheria never appears to be present in severe epidemic form, the deaths accredited t this disease are more numerous than in most towns in the East with similar climatic and other nditions to those of Manila.

Tuberculosis is a most important cause of morbidity and death, as in nearly all other Oriental wns; it would seem that the influenza epidemic of 1918 caused an appreciable rise in the tuber- losis death-rate, which is still higher than it was in any of the pre-influenza years during the riod now under consideration.

Only 445 deaths were ascribed to influenza in 1918. That this figure is a considerable under- tement is evidenced by the very high general mortality rate for that year, which is not suffi- ntly explained by the undue prevalence of other infectious diseases.

Plague.

The plague history of the Philippine Islands, which is, for all practical purposes, synony- ous with the plague history of Manila, is of considerable interest from several points of view. he islands have been remarkably free from bubonic plague and no epidemic of primary pneu- onic plague has ever been reported.

Plague infection was first introduced into Manila towards the end of 1899, presumably from ong-Kong. The first case was diagnosed on December 26th, 1899, and Manila remained ected until 1906. The following five years were completely plague-free, but in 1912 infection s introduced into both Manila and Iloilo. The disease first reappeared in 1912 in the large ain-stores of the Manila railway station, round which the infection was circumscribed. Cases d deaths were reported in Manila during each of the two subsequent years. Since 1914, how- er, the Philippines have remained completely free from indigenous plague infection.

With the exception of the small outbreak resulting in nine deaths in Iloilo in 1912, and two nited outbreaks, one in Naic and the other in Cavite, where infection was conveyed from anila in fodder and grain, Manila is the only place in the Philippine Islands which has suffered om plague. The total number of deaths ascribed to plague during each of the plague years s :

1900.	199	1905.	43
1901.	432	1906.	7
1902.	10	1912.	42
1903.	174	1913.	16
1904.	79	1914.	22

In 1901, the year of maximum incidence, the epidemic reached its height in the month of ay. In 1900, most plague deaths were reported in March.

During the plague years the disease prevailed with greatest intensity in the crowded hinese quarter of the town, especially along the water front of the Pasig River, where infec- on appears to have been first introduced. This is the quarter of the town which perhaps still ords most shelter for rats, and in those early plague years it certainly contained the greatest oportion of insanitary dwellings.

The distribution of plague cases among the various sections of the community between nuary 1st, 1900, and the end of 1903 was as follows :

Race	Population 1903	Plague incidence per 1,000 of population
Americans.	4,389	1.3
Europeans.	3,645	1.6
Chinese	21,230	27.2
Filipinos.	189,782	2.0
Others.	895	1.1

Very energetic measures were taken to eradicate the infection from Manila, with the degre of success that has already been referred to. These were chiefly measures of rat destructio and elimination in the infected areas of the city and in insanitary areas generally. Much attentio was given to "rat-proofing"; building by-laws were carefully enforced, and many improvement were made in the worst dwellings so as to diminish the shelter and food available for the rat popu lation.

It was not possible to obtain detailed information regarding either the proportion of th various species of rats prevalent in Manila, or the nature and degree of the flea infestation of th rats. Without information of this kind it is not possible to enter into a detailed discussion a to whether the conditions in the Philippine Islands are favourable or otherwise to the sprea of bubonic plague infection, or whether the incidence of human plague is likely to be an adequat index of the intensity of the rat epizootic. *Rattus rattus* and *Rattus norvegicus* are both prevalen and in the areas of the town bordering on the Pasig River it is probable that the latter specie is more in evidence.

From analogy with low-lying areas in neighbouring countries of the Far East, it appea likely that conditions are not so suitable to the propagation of bubonic plague as they are i the worst infected areas of British India, for example, and that it is only in places where rat infe tation is excessive that there is much danger of the disease persisting. The history of plague i the Philippine Islands appears to give support to this contention.

These remarks are not in any way a reflection on the truly admirable anti-plague work tha was carried out in Manila in conditions of extreme difficulty, the results of which reflect the ver greatest credit on all concerned.

Rat destruction still occupies the attention of the Manila health authorities. Spring trap wire traps and poison baits are used : during 1921, 92,671 rats were caught and sent to the Burea of Science for examination. None were found to be plague infected.

Cholera.

In the following table is set out the number of deaths that have been attributed to chole in Manila during each month of the past nine years :

Deaths attributed to Cholera in Manila.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	To
1914. . . .	16	22	4	0	0	0	36	60	100	24	11	15	2
1915. . . .	11	11	18	1	0	0	1	1	0	0	0	1	
1916. . . .	8	3	0	5	22	15	30	146	175	38	8	63	5
1917. . . .	4	3	0	1	0	0	0	0	0	0	0	0	
1918. . . .	0	0	0	0	0	0	0	0	12	69	33	9	1
1919. . . .	9	1	5	7	1	8	108	137	49	18	7	2	3
1920. . . .	1	0	0	1	1	0	0	0	0	0	0	0	
1921. . . .	0	0	0	0	0	0	2	0	1	2	1	17	
1922. . . .	15	4	1	1	0	0	0	2	0	0	0	0	

It will be noted that none of the years were completely free from cholera infection, thou cholera is not an extremely serious cause of mortality. As in most other towns of the Far Eas the years 1920-22 were relatively free from cholera; and as in all other parts of the East, 19 witnessed one of the most serious outbreaks of recent years. The seasonal prevalence of t disease is not very constant, but there is a tendency for most cases to occur during the thi quarter of the year.

The time and place distribution of these cases does not appear to support the idea that ch era is generally a water-borne disease in Manila, but it would be convenient in this place to s something regarding the water supply of that town.

At the time of the American occupation, the water supply of Manila was derived from t Mariquina River, not far from the town. There were many inhabited villages in the neighbourho of the intake and there was constant danger of pollution of a serious kind. A new supp was therefore required. This was obtained by damming a river in a mountain gorge some thir miles from the city with an extremely well-constructed masonry dam. The catchment area absolutely free from danger of pollution of any kind. Unfortunately the geological formati of the gorge is porous limestone. When the reservoir was inspected during the visit to Manil there was only a small pool of water above the dam and the water being used in the city w the old Spanish supply from the Mariquina River. This water was chlorinated, but that th was considered to be an insufficient guarantee of its purity was evidenced by official announc ments which appeared daily in the local press urging all people to boil the water before us. There does not appear to be any good reason why the water could not be made quite safe b efficient chlorinisation. In the rainy season there would doubtless be abundant water abo the dam of the new supply, and at such times Manila would be in possession of a water supp which it would be difficult to improve. With regard to the water for shipping, it should be not that there is a good supply of unquestionable purity at the Quarantine Station of Mariveles, ne the entrance to Manila Bay, and ships could fill their water tanks there without going more th a mile or two out of their course.

Some interesting observations have been made in Manila in connection with cholera carrier the work has been undertaken by the Philippine Bureau of Science. During 1921 the intestin contents of 3,094 bodies that were examined post-mortem were investigated and the chole

ibrio was found in seven. The people in question had died from various causes, none of which nically resembled cholera. The excreta of 3,033 cholera contacts were examined, but the cho-a vibrio was found in none. Of 53,078 persons examined in connection with an intestinal ifection survey, no fewer than 22 were found to harbour the cholera vibrio. The total number persons examined was thus 59,205, of which 29 harboured the vibrio. These results in a year which cholera incidence was unusually low are of extreme interest : they indicate that cholera an endemic disease in the Philippine Islands.

Smallpox.

Reference to the table produced on page 123 will show that smallpox is a relatively unimportant cause of mortality in Manila in normal years, but that serious epidemics occur from me to time. The years 1910 to 1915 inclusive were completely free from smallpox, as have een the last two years 1921 to 1922. In 1918, however, an outbreak which resulted in 989 deaths ided appreciably to the mortality of that unusually unhealthy year. Most of the deaths occurred nong unvaccinated children. That outbreak was responsible for a great increase in vaccination activity, a branch of public health work to which careful attention is still given. During 921, 138,517 vaccinations were performed.

In the public health reports of the Philippine Islands and of Manila one finds frequent reference to "varioloid". As a certain number of these cases end fatally, the question arises as to hether they should not be considered as true smallpox. During 1921 there were two cases of arioloid notified in Manila, neither of which died. In that year 196 cases of chicken-pox were also gistered; none of these proved fatal.

As in all other countries in the East, epidemics of smallpox almost invariably occur in the rst half of the year.

Other Causes of Mortality.

Very nearly one-half the total deaths registered in Manila are year after year attributed to ie four following diseases : tuberculosis of the lungs, beriberi, acute bronchitis and broncho-neumonia. In the following table the number of deaths for which these diseases have been esponsible during the years 1916 to 1921 is set out :

Diseases	1916	1917	1918	1919	1920	1921
Tuberculosis of the lungs	1,174	1,250	1,692	1,424	1,419	1,359
Beriberi	684	403	571	327	555	705
Acute bronchitis	516	469	981	443	638	689
Broncho-pneumonia	269	289	884	301	379	465

The pulmonary tuberculosis death-rate increased as a result of the 1918 influenza epidemic, ut is now once more on the downward grade. Deaths attributed to acute bronchitis and broncho-neumonia are still markedly in excess of the mortality they caused in pre-influenza years.

Beriberi is a serious cause of morbidity and death and the figures for recent years indicate n increasing prevalence.

Sewage Disposal and Conservancy.

The central parts of Manila are for the most part sewered : the system appears to be extremely vell designed and constructed. The effluent is discharged into Manila Bay about a mile from he shore without the least offence or fouling of the foreshore. There are a large number of bucket atrines necessitating hand removal of night-soil. In the sewered area of the town this is very fficiently carried out : the night-soil is taken to the sewage pumping station. There are also number of septic tank latrines in use, which appear to give satisfaction.

In the outskirts of the town surface drainage is sometimes open to criticism.

In the central parts of the city scavenging appears to receive careful attention. A considerable roportion of the garbage is incinerated; the remainder is used for the reclamation of swampy reas.

Hospitals and Scientific Institutions in Manila.

Manila is well provided with hospitals, in contrast with the provinces of the Philippine Islands, vhere hospital provision falls short of the needs of the population. Space does not permit of nore than passing reference to the admirable general hospital and medical school, the missionary nd other general hospitals, the leper asylum, and the lunatic asylum. All these and several ther institutions in Manila were visited. The infectious diseases hospital, built on the pavilion ystem, is adequately installed.

The Philippine Bureau of Science, in which medical as well as most other forms of scientific esearch and investigation are undertaken, fully merits the very high reputation it has achieved by the scientific reports that have emanated therefrom since its inauguration in the early years of the present century.

Port Health Work in the Philippine Islands.

Port health work in the Philippine Islands is carried out by the Public Health Service of t United States, and is in charge of a port health officer with headquarters at Manila. Vesse arriving from foreign countries are inspected at the following seven ports : Manila, Cebu, Iloil Zamboanga, Jolo, Cavite and Olongapo. The number of vessels inspected, with the numb of passengers and crew and the number of vessels fumigated, in each of these ports during t year ending June 30th 1922, was as follows :

	Number of vessels inspected	Passengers and crew inspected	Number of vessels fumigated
Manila	775	129,043	181
Cebu	75	5,837	71
Iloilo	47	495	251
Zamboanga	24	2,845	0
Jolo	39	3,352	0
Cavite	44	5,729	0
Olongapo	2	195	0

The port health work at Cavite and Olongapo is undertaken by naval medical officers.

By far the most important port from the point of view of overseas traffic is Manila; tim did not permit of a visit to any of the other ports in the Philippines.

The port health staff of Manila consists of the chief port health officer with three medic assistants, who act as boarding officers. These officers also supervise the fumigation of ship The office staff of the port health officer consists of a chief clerk with five assistants. There are tw launches at the disposal of the port health staff.

Manila and Cebu are the only two ports which possess a quarantine station. That of Mani is situated at Mariveles, near the entrance of the bay, upwards of 30 miles from the port are The station is well installed and equipped and has satisfactory bathing accommodation and disi fecting plant. There is a very good water supply. Large ships can come alongside the admi able wharf at all states of the tide. The station is in all respects adequate to the needs of Manil and its only drawback is its relative inaccessibility by a small launch in very rough weather.

It will have been noted that there are only three ports in the Philippines in which vesse are fumigated. The method of fumigation employed is by burning sulphur in pots. Fumigatic is carried out, however, with careful attention to detail and the results appear to be very sati factory. It is considered that this simple method properly carried out can rival the use of t Clayton apparatus as regards efficiency.

The plague-infected port with which Manila is in closest communication is Hong-Kong. Durir the epidemic season in Hong-Kong, all ships sailing between that port and Manila are fumigate every trip and the rats found are examined for plague. Some of the results obtained by th frequent fumigation are interesting, inasmuch as they give an indication as to the number of ra which may gain access to a vessel during a few days' sojourn in a port such as Hong-Kong. O one occasion recently a vessel of about 1,500 tons was fumigated on arrival in Manila 15 da after the date of the previous fumigation : no fewer than 37 dead rats were found after the secon fumigation.

The total number of vessels fumigated in 1921-1922 in the Philippine Islands was 503. Th number of rats found after fumigation was 1,361. All vessels that trade in the Philippine Islanc are fumigated once in every three months.

All emigrants arriving in the Philippine Islands are examined by the port health staff an all steerage passengers are vaccinated against smallpox, irrespective of the port of departure.

Port health procedure in the Philippine Islands is based on the well-known quarantine law and regulations of the United States, and the bill-of-health form in use is that prescribed by thos regulations. The American bill-of-health form and the form employed in the ports of the Strai Settlements are the two most complete and satisfactory bills of health at present in use in the Fa East.

The number of ships from foreign countries that entered the ports of the Philippines durir 1921 was 871 (2,646,455 net tons) : of these, 710 (2,306,338 net tons) came to Manila. Vesse licensed for the coastwise trade of the Philippines in 1921 consisted of 162 steamers (26,000 tons 763 sailing craft (27,000 tons); and 1,976 lighters and harbour craft (40,000 tons).

XVIII — FRENCH INDO-CHINA.

French Indo-China comprises the eastern portion of the Indo-China peninsula, the west of ·nich is occupied by Burma, and the central portion by Siam. The frontiers of French Indo-(nina are contiguous with those of China on the north, and Siam and, for a short distance, Burma (t the west. It extends from 23° to 8° north latitude and lies between 100° and 110° east longitude.

French Indo-China includes five countries :

	Area (Sq. kilometres)	Population
Tonking	103,450	6,850,000
Annam	180,000	4,933,000
Cochin-China	56,965	3,796,000
Cambodia	150,000	2,403,000
Laos	230,000	819,000
	720,415	18,801,000

In addition to the above, the territory of Kwangchow Wan, which was leased to France by ·nina in 1892, is included in French Indo-China. Kwangchow Wan has an area approximating ·000 square kilometres and a population of about 182,000.

French Indo-China has thus a total area very little less than one and a half times the size of ·rance. The population is heterogeneous. Annamites, Cambodians, and Thais are the three ·incipal component races of that population. The Annamites form the great majority, not less ·an three-quarters of the population of Indo-China. The estimated number of Cambodians is ·mewhat in excess of one million and a-half; that of the Thais somewhat less than this figure.

Of the five large divisions of French Indo-China, Cochin-China is the only French colony in ·e strict sense of the term. The other divisions are dependencies. These dependencies have a ·rtain amount of autonomy, but in so far as public health work and administration are concerned, ·e distinction between colony and dependency is of little moment.

The French administration of colony and dependencies alike is under the control of a Governor-·eneral, resident at Hanoi, in Tonking, who is appointed by the French Government. The repre-·ntative of the Governor-General in Cochin-China is called the Governor of Cochin-China. In ·e other four divisions he is known as the "Résident supérieur".

Medical Administration and Staff.

The medical and sanitary administration of French Indo-China is under the direction of an Inspecteur Général", who has two deputies, the one in charge of the civil side of the office, the ·her in charge of the military side.

In each of the five constituent countries, there is a "Directeur local de la Santé" (who in Laos · termed the "chef du Service de l'assistance médicale").

The "assistance médicale" employed in 1921-1922 111 European doctors, of which 75 belonged · the cadre of the colonial service. In addition to these European doctors, there are 113 qualified ·ative practitioners who are termed "médecins auxiliaires de l'assistance médicale de l'Indo-·hine". These European doctors and assistants were distributed among the various divisions · Indo-China as follows :

	European Doctors	Medical Assistants
Tonking	42	25
Annam	14	19
Cochin-China	30	46
Cambodia	14	15
Laos	6	5
Kwangchow Wan	1	1
TOTAL	111	111
Consular medical posts		2
		113

Very noteworthy and remarkable progress has been made during recent years in connection ·ith maternity hospitals and the supply of trained midwives for the indigenous population in ·ll the states of Indo-China. Attached to the staff of the "assistance médicale" there were in ·921, 297 midwives ; of these, 238 were in Cochin-China, 40 in Tongking, 11 in Annam, and 8 in ·ambodia. These midwives are trained either at Cholon or Hanoi. The course of training lasts ·vo years. In addition to their special functions, they are engaged in infant welfare, for which ·ey are specially trained. They act as "visiteuses d'hygiène infantile". In 1921 there were ·8 midwives undergoing training at Cholon and 15 at Hanoi.

Something has also been done in the direction of making the native untrained midwife, know locally as *Ba-mu*, the equivalent of the Indian *Dhai*, less dangerous and more efficient. In certai of the provinces, selected *Ba-mu* have been given a four-months course of instruction in centr provincial maternity hospitals. Practically all the provincial general hospitals have a maternit ward, and the fact that the accommodation available falls short of the demand is surprising to a conversant with the traditions and prejudices of the East with regard to this matter of maternit

The "Assistance médicale de l'Indo-Chine" has at its disposal :

7 mixed hospitals.
101 native hospitals (*ambulances*).
32 contagious diseases hospitals (*lazarets*).
92 dispensaries, medical posts, etc.
63 maternity hospitals.
7 crèches.
6 orphan asylums.
10 leper asylums or villages.
12 homes for incurables.
1 lunatic asylum.

The budget for the medical and sanitary service in French Indo-China in 1921 amounte to 3,960,857 piastres.

The amount of work done in the hospitals of French Indo-China is very considerable : durin 1921 there were 126,458 admissions to hospitals, amounting to 2,294,447 hospital days. Th number of consultations in hospitals aggregated 3,035,589. These figures relate to the indigenou population only.

Cochin-China has been longer under French administration than any other part of Indo-Chin and is richer by far than the dependencies : consequently medical and sanitary work is bett developed there than elsewhere. In 1921 in Cochin-China approximately one-third of the tot labours either took place in maternity hospitals or were attended by qualified doctors or diplomae midwives.

Medical Scientific Institutions.

In French Indo-China there are two Pasteur Institutes, one at Nhatrang in Annam, and th other at Saigon. Both these institutes are affiliated to the Pasteur Institute of Paris and a under the general direction of Dr. Yersin, the *mandataire* of the Paris Pasteur Institute, who also in direct charge of the laboratories at Nhatrang.

The Pasteur Institute at Nhatrang devotes practically all its time and attention to the diseas of animals, cattle plague and the like, and manufactures large quantities of serums used in vet rinary work. The activities of the Pasteur Institute at Saigon cover a larger field. This is th older institute of the two, founded in 1891 by Calmette; it was, in fact, the first institute of i kind in the tropics. It is now being rebuilt and will very soon be housed in a manner worth of the scientific research work that is being carried on there. The amount of medical scientif investigation and routine clinical laboratory work carried out is very large indeed. Vaccin of all kinds are manufactured on a large scale and supply most of the needs of Indo-Chin Both Pasteur Institutes are very efficiently administered and are doing work of the greate interest and importance.

There are three hygiene and bacteriological institutes, one for Tongking, one for Cambodi and one for Annam. In addition to these, smallpox vaccine is made at two vaccine institute one in Tongking, the other in Laos.

There is a medical school at Hanoi which has recently become an "école de plein exercice and is adequately equipped. The school was started in 1902. The course of study is of fou years duration. A few students go to France each year (on the successful termination of the four-years course) where they are allowed to sit for their Doctorate examinations after a furth year of clinical study. The students, of which there were 130 in 1921-22, are for the most pa natives of Indo-China; there are, however, a few Chinese. Since the school was opened, 1(pupils have been given diplomas and been nominated "médecins auxiliaires de l'assistan médicale". The main object of the college has been to train efficient assistants for the medic and sanitary service of the colony.

The chief school for nurses is at the municipal hospital in Cholon. The midwives traini school at the maternity hospital in Cholon is doing admirable work.

In Hanoi there are also a chemical laboratory (military); an electrotheraphy and radiograph institute, and a bacteriological laboratory attached to the large native hospital. This lab ratory is engaged almost exclusively on routine clinical work.

Pasteur anti-rabies treatment is undertaken at Saigon, Hanoi, and Hue. During 192 452 persons submitted themselves to this treatment in Saigon; 120 in Hanoi; and 95 in Hue.

All the scientific institutions referred to above were visited.

Vital Statistics and Epidemic Diseases.

With the possible exception of certain of the larger towns, the recorded number of birt and deaths is approximate only. The registration of births and deaths and the notification cases of infectious diseases are legally compulsory, but the law is difficult to apply. In rural are the headman of the village is responsible for recording births and deaths, and of reporting the to the central provincial authority. In certain villages this work may be efficiently carried ou

t it is unfortunate that the system of taxation in vogue in all the divisions of Indo-China is such to make the suppression of information regarding births and deaths a matter of possible financial gain to the head of the village community. The same difficulty arises when an attempt is de to obtain an accurate census of the population. It is to the financial advantage of the adman of a village to have a population under his control in excess of the official figure.

From the public health point of view this state of affairs is most unfortunate. In most ier countries in the East, excepting of course China, it is possible to obtain approximately urate information regarding the total number of deaths that occur, the approximate age and of the deceased, and the date on which death took place. When such data are available a series of years, it is possible to arrive at many interesting deductions regarding the epidemic stitution of the country concerned, even though but little reliance can be placed on the reted cause of death, and to estimate the efficiency of the notification of infectious diseases. st of the serious epidemic diseases of the East have a characteristic and relatively constant sonal prevalence.

Some admirable work is now being done in Indo-China with regard to malaria suppression rural areas, and a commencement has been made in Cochin-China in the campaign against erculosis. Without accurate information regarding the present mortality of the area concerned, t will be impossible to frame an estimate of the amount of good done by these most important emes.

With regard to infectious diseases, there is no doubt that the reported number of cases and aths falls short in general of the truth. Though this be so, it is unlikely that any disease causing preciably increased mortality could persist for any length of time undetected in any part of Indo-na.

During 1921 notified cases and deaths attributed to epidemic diseases were as follows :

Diseases	Europeans		Natives	
	Cases	Deaths	Cases	Deaths
Typhoid fever	10	1	99	29
Smallpox	1	0	1,456	225
Diphtheria	21	0	21	1
Cholera	4	2	4,432	2,838
Plague	2	1	1,099	947
Dysentery	15	0	3,155	29
Cerebro-spinal Meningitis	5	1	139	44
Influenza	2	0	1,627	216
Typhus	1	1	0	0
Relapsing fever	0	0	2	0
Chicken-pox	0	0	126	0

The chief diseases observed among natives during 1921 in their order of frequency were as ows :

Malaria	13,877 cases.
Syphilis	5,415 —
Other venereal diseases	4,471 —
Cholera	4,432 —
Bronchitis	3,254 —
Dysentery	3,155 —
Tuberculosis	2,275 —
Beri-beri	1,664 —

The above short table indicates the large part played by malaria in the production of ill lth. It is not only the direct cause of much sickness, but malaria is also a predisposing cause nfections of many kinds. About two-thirds of the cases of malaria observed are benign tertian ype, the remainder being for the most part malignant tertian. Quartan malaria is relatively ae. Anti-malaria measures have recently engaged considerable attention in some of the most larious districts of Indo-China. An endeavour is being made to improve the sanitary condiis generally and the mode of life in certain selected malarious villages. Quinine has been tributed free in malarial localities in large quantities. The consumption of quinine in Indo-na in 1921 amounted to 1639 kilos.

Next to malaria, tuberculosis and venereal disease are the two most important causes of morbility and death. Trachoma is likewise extremely prevalent.

Cholera.

Cholera is an endemic disease in Indo-China. There is never a month without a case or es of cholera being reported from one or more of the provinces. Widespread devastating demics of cholera are, however, of very infrequent occurrence. Below is given in tabular m the number of cholera cases and deaths that have been reported each year from 1912 to 1921 :

Yr	Cases	Deaths	Year	Cases	Deaths
9	15,183	12,028	1917	2,313	1,439
9	353	281	1918	2,029	1,456
9	798	489	1919	6,418	4,798
9	9,894	6,326	1920	1,591	1,035
9	9,774	6,987	1921	4,482	2,838

If the above figures represent a large proportion of the cases that have actually occurred—an this is believed to be the case—the incidence of cholera in Indo-China with its population of nc less than 19 millions cannot be considered excessive considering the conditions under which th rural population lives and the fact that infection is always present.

In 1921 cases were reported in each month of the year; the incidence was highest in th month of June. Laos was the only one of the constituent countries of Indo-China that appeai to have been altogether free from cholera infection. Of the 4482 cases attributed to cholera i 1921, no less than 2,208 cases were reported from Cochin-China. The disease in 1921 was of severe type with a high case mortality rate. The severity of the disease appears to be subjec to considerable variation in different years in Cochin-China. In 1921 the cases were for th most part scattered, and there were no very serious outbreaks.

In addition to the usual prophylactic measures, cholera vaccination has been undertake on a large scale in recent years, and local expert opinion is emphatic in the assertion that syste matic cholera vaccination is of the utmost value in checking an epidemic. It is reported tha not a single case occurred among the vaccinated in Cochin-China during the outbreak of 192 In that year 127,361 cholera vaccinations were performed in Indo-China, of which 103,635 wer done in Cochin-China. The number of cholera vaccinations performed in the previous yea 1920, was only 44,428. As further evidence of the efficiency of cholera vaccination, it is note worthy that not a single case has occurred among the military personnel employed in Cochir China since this vaccination was systematically performed, though cholera has not infrequentl prevailed in the immediate vicinity of such personnel. Cholera vaccination is now compulsor in any region of French Indo-China which may be declared to be infected. The absence of an reaction following inocculation with cholera vaccine is probably responsible for the fact that ther has not been any opposition to this procedure from the native population.

Plague.

Bubonic plague has never been a very serious cause of sickness and mortality in French Indo China, and it has never prevailed in epidemic form very far from coast or river ports. Infectio was introduced in the early years of the present pandemic and has persisted in small foci eve since.

The total number of cases and deaths accredited to plague during each of the years 1912 1921 are as follows :

Year	Cases	Deaths	Year	Cases	Deat
1912.	1,737	1,499	1917.	1,105	78
1913.	3,791	3,780	1918.	1,802	1,41
1914.	2,054	1,587	1919.	842	70
1915.	976	767	1920.	650	57
1916.	844	534	1921.	1,099	94

In 1921, Laos was as usual completely free from the disease.

In Tonking, there was a localised outbreak in the port of Haiphong, which lasted from Marc until June 1921, since which date Haiphong has been completely free from indigenous plague It is believed that infection was introduced into Haiphong from Hongkong. A small outbrea was responsible for 152 reported cases, of which 134 proved fatal. The disease appears to hav been confined to the most crowded quarter of the town, and the port area appeared to remai free from infection throughout.

In Annam, the reported cases and deaths ascribed to plague in 1921 amounted to 247 an 210 respectively. In the south of Annam there are three coastal towns—Phanthiet, Phangron and Phanri—which are small but persistent centres of plague infection. In 1921 the case and deaths of plague in these three towns numbered 163 and 152; 24 and 21; and 6 and 6 respec tively.

In Cochin-China, plague was responsible for 147 cases and 87 deaths in 1921. Here th suburbs of Saigon and the town of Cholon, which in reality forms a part of the city of Saigor were responsible for the majority of the reported cases. It is noteworthy that most of the ric mills and stores in the neighbourhood of the port are situated in Cholon.

Cambodia, as usual, suffered more than the other divisions of French Indo-China and wa responsible for 446 cases and 439 deaths attributed to plague, a case mortality rate which at firs sight indicates defective notification of mild cases. The large town and river port of Phnor Penh is considered to be the most important endemic centre of bubonic plague in Indo-China This fact prompted the inclusion of Phnom Penh in the itinerary : its plague experiences are de scribed below. Kwangchow Wan reported 126 cases and 123 deaths in 1921 : small endemi centres of infection appear to exist in the island of Tangshai, Paolo and near Tchikan.

On the whole, it would appear that conditions, climatic and other, in Indo-China are no favourable to the prevalence of bubonic plague. The history of the disease in this country i very similar to its history in Siam, Burma, the Straits Settlements and the coastal towns of Java having been characterised by persistent infection with relatively small human incidence.

During 1921, nearly 46,000 persons were innoculated with plague vaccine. As in Britis India, but in contra-distinction to the experience of the Dutch East Indies, this vaccine is cons dered to be most effective in producing immunity.

The seasonal prevalence of plague in Indo-China is neither so well marked nor so charac teristic as it is in the more severely infected countries in the East. This remark applies especiall to Cambodia, where the monthly incidence of reported plague mortality is most unusual, and i

kingly dissimilar to that of Annam and Cochin-China. Below is set out the monthly incidence cases and deaths in each of the divisions of Indo-China during 1921 :

Plague 1921.

onth	Tonking and Kwangchow Wan		Annam		Cochin-China		Cambodia		Laos	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
uary.	—	—	25	21	3	1	29	29	—	—
ruary.	—	—	22	19	6	2	30	30	—	—
ch.	10	10	17	15	6	5	38	38	—	—
il	77	60	39	32	16	7	38	35	—	—
. . . . .	144	137	18	13	17	9	27	6	—	—
e.	43	47	6	6	17	8	28	28	—	—
. . . . .	4	3	2	2	19	13	41	40	—	—
ust.	—	—	8	8	28	21	33	31	—	—
tember.	—	—	6	5	15	8	16	16	—	—
ober	—	—	4	3	8	4	30	30	—	—
ember.	—	—	61	37	7	4	54	54	—	—
ember	—	—	26	26	7	4	81	81	—	—

Plague in Cambodia is very largely confined to the capital city Phnom Penh. The behaur of plague in that town is unusual in many respects other than that of seasonal prevalence eady referred to. Deaths attributed to plague in Phnom Penh during each of the last ten years 3-1922 have been as follows : 327; 305; 151; 144; 227; 387; 87; 226; 397; 640; respectly. Figures for the first four months of the present year indicate that the number of plague ths in 1923 is likely to exceed the record mortality of 1922.

Plague infection appears to have been introduced into Phnom Penh in the year 1907. At y rate this was the first year in which plague cases and deaths were recognised and reported. ne of the local authorities, however, are of the opinion that the disease has long been present that town. Since 1907 only once, namely in 1919, has the annual plague mortality fallen brt of 100. It is not possible within the scope of this note to describe in any detail the plague tory of Phnom Penh. It must suffice for the present to refer briefly to the more unusual teats of the last few epidemics.

During the earlier plague years a very large proportion of the cases that occurred were clinicly bubonic in type; in 1912, for example, 75 per cent. of the cases were characterised by bubos. ring the last few years, however, the proportion of bubonic cases has become less and less. 1922, bubonic cases contributed but 10 per cent. of the total deaths ascribed to plague: the t of the fatal cases were "septicæmic". The vast majority of cases are discovered by the oratory examination of a fragment of liver taken from the body post-mortem. Most of these es are said to have presented during their last illnesses none of the symptoms commonly ociated with plague; many presented symptoms which seemed to justify a very different nical diagnosis.

It appears that there is still a small quarter of the town in which the majority of the cases sent more or less classical symptoms : here the proportion of bubonic cases is as high as ever vas. In this small quarter of the town, plague infected rats *Rattus rattus* and *Rattus concolor* (?) not uncommonly found. Elsewhere the disease is said to have changed its type.

The anomalous cases of plague have been scattered throughout many parts of the native y and no undue rat mortality has been observed in connection with the majority of these cases.

Another remarkable fact regarding these anomalous cases of plague in Phnom Penh relates age incidence. A very large proportion of the fatal cases observed during 1922 were among ants in the first year of life. Plague is said to have been responsible for the deaths of two ants one day old, of one infant aged two days, of one aged three days, of three aged five days, o aged six days, two aged seven days, and 36 others less than one month old. In 1921, of the 7 plague victims recorded, no less than 168 were children under ten years of age. Sixty-five these were infants under one year of age. Practically none of these juvenile cases are bubonic. a somewhat long experience of plague, never has the writer encountered so heavy an incince of the disease in the first year of life. Even during severe epidemics deaths from plague children less than one year old are, relative to the total mortality, excessively rare.

A further remarkable observation has been made in Phnom Penh. The last annual report ites that the number of musk rats (*Crocidurus caeruleus*) found infected with plague has been ry high. The local authorities consider this "insectivor" to be particularly dangerous. Expence in other countries, and the writer's own observations, have shown that elsewhere this imal is extremely resistant to plague, and is consequently entirely harmless from the point of ew of plague. The species appears to be the same as that which is so prevalent in British India, here many thousands have been examined during plague epizootics, but none have been found gue infected. In India rat-killing staffs are sometimes forbidden to trap this animal : their sectivorous habits are of some value. In Indo-China double the "reward" is sometimes offered a musk rat than is given for the rat which is elsewhere of sole importance.

When all the above facts are considered together, it is impossible to avoid a doubt as to e nature of some of these cases. All with experience know that certain other organisms very osely simulating *Bacillus pestis* frequently give rise to much difficulty and confusion, more espeally in such a hot damp climate as that of Cambodia. It has been stated that the diagnoses are ade chiefly as a result of the laboratory investigation of fragments of liver removed post-mortem. he writer was privileged to see the well-equipped laboratory in which these diagnoses are made,

and was shown microscopical preparations of an organism that was, in appearance, typical of th plague bacillus, by the very competent bacteriologist in charge of the Institute. It appea that the organism readily kills guineapigs, and that the post-mortem appearances in the inn culated animal are typical of plague.

It is not insinuated that plague does not exist in Phnom Penh : the disease is undoubtedl endemic in the city, but it is open to doubt whether the true number of cases that occur for more than a proportion of the cases and deaths which are now attributed to plague in the healt reports of that city. A fact which appears to afford support to this contention is that thoug the deaths from plague have increased in a striking manner during the last two years, the tot mortality rates from all causes have remained reasonably constant.

The above paragraphs have been written not without some misgivings. The techniqu employed in the laboratory is so obviously good. The question at issue is, however, of mo than local and academic interest and importance. Phnom Penh is reputed to be the most impo tant focus of plague infection in French Indo-China : it is, moreover, an important river por If the anomalous cases be indeed plague, the other facts being as stated, one's ideas regardin certain fundamental epidemiological features of plague will have to be revised. It is probabl that the Government of French Indo-China will cause an enquiry to be undertaken in the matte in the near future, the results of which will be awaited with much interest.

Considerable attention is paid in Phnom Penh to the capture of rats. Special rat-catchin gangs are employed and a reward is paid for every rat brought in. The number of rats accounte for in 1921 was 99,363.

There is not sufficient information available to justify definite statements as to the relativ prevalence of various species of rats. In Cambodia *Rattus rattus* is present. In Saigon and Cho lon both *Rattus rattus* and *Rattus norvegicus* are in evidence. In Annam specimens of the mos common rat which were shown to the writer were undoubtedly *Rattus concolor*. Very few detaile observations appear to have been made regarding the species of fleas infesting the rats and th degree of flea infestation.

Smallpox.

Smallpox infection is always present in French Indo-China as it is in every country in th Far East, but the attention that has been paid to vaccination has resulted in making smallpo a not very serious cause of morbidity and death. Below is given the number of cases and death ascribed to smallpox during each year of the decade 1912 to 1921.

Year	Cases	Deaths	Year	Cases	Death
1912	924	300	1917	5,000	1,09
1913	3,887	2,129	1918	5,945	1,50
1914	1,239	123	1919	2,576	80
1915	989	157	1920	3,305	77
1916	1,316	244	1921	1,456	22

The disease was present in 1921 in all months of the year.

Infant vaccination is compulsory, and that the law is effective is evidenced by the fact tha few cases of smallpox occur among infants and small children. As in other countries re-vaccin ation is not infrequently neglected, and this fact is responsible for the amount of smallpox tha still persists. As in most eastern countries, the people take kindly to vaccination, and the enforce ment of the law is attended with but little opposition. Most of the vaccine used is manufac tured at the Pasteur Institute of Saigon and the vaccine institute in Tonking. There is also a small vaccine institute in Laos. Buffalo calves are used in the manufacture, and the lymph obtained is said to possess a very high degree of potency, giving a success rate of little short of 10 per cent in primary vaccinations. The number of vaccinations performed each year from 191 to 1921 is as follows :

Year	Vaccinations	Year	Vaccinations
1912	1,118,582	1917	2,574,544
1913	1,286,954	1918	2,945,187
1914	1,404,874	1919	2,245,577
1915	1,352,246	1920	2,178,019
1916	1,372,656	1921	2,319,568

Leprosy.

Leprosy is widely spread throughout Indo-China though the number of known cases does not exceed 4,040. A large proportion of these cases are interned in leper asylums or leper villages where they are kept under observation. The ethyl esters of chaulmoogra oil are being used in the treatment of the disease with encouraging results.

Beri-beri.

During 1921, 1,609 cases of beri-beri were notified, and 264 deaths were ascribed to this disease. Of these totals no less than 1,210 cases and 216 deaths were reported from Cochin-China. It is said that highly polished rice is not commonly used by the people, though Indo-China is of course essentially a rice-producing and a rice-eating country. To this fact is possibly due the relatively low prevalence of beri-beri. Some extremely interesting and important investigations into the etiology of beri-beri are being undertaken in the Pasteur Institute of Saigon.

Dysentery.

Dysentery is a common disease in Indo-China, but it does not appear to be an important se of mortality. During 1921, 3,155 cases were notified, of which only 29 proved fatal. Abscess he liver is now a rare disease among Europeans owing, it is believed, to the use of emetine he treatment of amoebic dysentery. Among the natives of Annam, however, liver abscess ot uncommon. With regard to the various forms of dysentery encountered in Indo-China, following figures giving the results of the examination of 1000 stools at the Pasteur Institute aigon are of interest :—Amoebae were found in 164; flagellates (*Trichomonas, Lamblia tetra-is*) in 165; intestinal worms in 97; spirilla in 153; and dysentery bacilli in 31.

Typhoid Fever.

Typhoid fever occurs sporadically in all parts of Indo-China and at all times of the year, it is by no means as common a disease as in many other parts of the East. During 1921 the s and deaths of typhoid observed among Europeans were 10 and 1, and among natives 99 29. Paratyphoid fevers appear to be still less common : paratyphoid A is the type most in lence : paratyphoid B is excessively rare.

Influenza.

During 1921 the reported cases and deaths of influenza amounted to 2,078 and 329 respec-ly. The disease was most in evidence in Annam during the early months of the year. During world-wide pandemic of 1918-1919 influenza was widespread in Indo-China, but the disease relatively of a mild form, and except for a few outbreaks in the hilly country in the interior, as not responsible for anything approaching the devastating mortality rates that were expe-ced in parts of British India, for example. In this respect the experience of Indo-China appears ave been comparable to that of Burma.

Cerebro-spinal Meningitis.

Cerebro-spinal meningitis was practically an unknown disease in Indo-China before 1917 n infection seems to have been introduced from China across the northern frontier. It will be embered that the following year, 1918, witnessed the severe outbreak of this disease in Hong-g. Since 1917 cerebro-spinal meningitis has been constantly present, but has not prevailed pidemic form. During 1921, 142 cases and 45 deaths were ascribed to this disease among natives of Indo-China; of these, 118 cases and 43 deaths were reported from Tonking. In lition to the above there were five cases notified among Europeans of which one proved fatal.

Tuberculosis.

The prevalence of tuberculosis is extreme throughout all parts of Indo-China. The condi-s of life are nearly everywhere favourable to the propagation of this disease. Malaria and, to sser degree, syphilis, are common potent predisposing causes of infection. The wide-ad prevalence of tuberculosis constitutes perhaps the most grave problem facing those respon-e for public health activity in Indo-China. The question is now engaging the attention of Saigon Pasteur Institute.

Extent of the Tour in Indo-China.

The tour in Indo-China started in Haiphong, where the port health procedure and organi-on received attention. Hanoi was the next town visited, the journey between the two places g made once by motor and once by rail. In Hanoi consultations with the director of the dical and sanitary services of Indo-China and visits to numerous hospitals and laboratories pied most of the time available. Something was also seen of public health activity in the cent rural areas of Tonking.

The journey from Hanoi to Saigon, approximately 2,000 kilometres, was accomplished by or-car. The excellent road runs parallel with and close to the coast line. Full advantage taken of the opportunities afforded to see something of the medical and sanitary work in the ns and villages along the road. Hospitals and other institutes of health interest and import-e were seen at Thanh-Hoa, Vinh, Dong Hoi, Hue, Tourane, Quang Ngai, Quinhon, Nhatrang, n Rong, Dalat and Phanthiet. Many of the places and institutes seen would receive descrip-notes were it not for the limitations of space imposed by the nature of this report.

Especially worthy of notice are the Pasteur Institute of Nhatrang and the hospital, oph-mological institute, bacteriological laboratory and the water supply of Hue, the capital of nam. The hospitals of many of the other towns are very well installed. In Annam and in other provinces of Indo-China preventive medicine is not a very specialised subject : it is one he functions of the medical service, which is primarily responsible for the administration of hospitals and other purely medical work. All the same, there is evidence of a praiseworthy lency to devote more and more attention each year to the preventive side of medicine. The d work that is being done in the treatment and prevention of trachoma among school chil-n, a disease which is terribly prevalent in Annam, should be mentioned.

In Saigon and Cholon visits were paid to practically all the very numerous hospitals, ins tutes, asylums, etc. Something was seen of rural sanitation and medicine and of the very su cessful anti-malaria work that has been carried out recently in certain rubber estates situat in what were formerly very malarious districts of Cochin-China. From the health point of vie Cochin-China is very much further advanced than are the other provinces. Some of the villa sanitation work that has been carried out very recently deserves great praise. All these inspe tions were of great interest, and once more it is regretted that space does not permit of detail description.

The journey from Saigon to Phnom Penh, the capital of Cambodia, was also made by motor-c In Phnom Penh there was very much to see of public health interest and importance. Incide tally it may be remarked that it is doubtful whether finer motoring roads exist anywhere in t world than in Cochin-China.

This condensed summary of a most instructive and interesting tour has been included wi the express purpose of giving some idea of the difficulty of writing even a summarised report all matters which are of great health importance : a difficulty that has been experienced in m of the countries visited. There are even several matters regarding dwellings, habits and custo of the people, that have a direct bearing on the epidemic constitution of the country, which m be neglected.

The Ports of Indo-China.

In comparison with the very long stretch of magnificent coast line, it is rather surprisi that good ports are few and far between. Saigon and Haiphong are by far the most importa ports from the point of view of overseas commerce, but even these two ports are relatively in cessible. Saigon is a river port 45 miles from the sea, and the approach to Haiphong, which also situated at the mouth of a river, is very difficult for large vessels, except at high tide; and make matters worse, there is only one tide a day in the Gulf of Tonking. Along the coast Annam there are numerous small ports of importance from the view point of coastal traffic alo

Saigon.

The port of Saigon is situated on the banks of a river of the same name, about 45 miles fr its mouth. The river is deep enough at high tide to give access to vessels of the largest si The more important quays are on the right bank of the river, where the newer wharves and wa houses are of a good type and well constructed. Mooring facilities for vessels in the strea are good and adequate.

The number of ships that left the port in 1921 was 3,945, of which 835 were large sea-goi vessels. The total tonnage of marchandise entered and cleared from Saigon during the sa year amounted to 3,181,960 tons. Exports were more than four times greater than the impo Of the merchandise exported from Saigon in 1921, no less than 1,530,000 tons consisted of ri The above figures included river-borne as well as sea-borne traffic.

Adjacent to Saigon is the very important river port of Cholon, which should be consider as part of the same town. This is the most important river port of Indo-China. Here a situated a large number of the most important rice mills and rice stores of the country. In 19 nearly a million and a half tons of husked rice were exported and more than 1,700,000 tons f padi were received.

The port health work of Saigon is carried out under the direction of the Director of Pub Health of Cochin-China. Under his direction two European medical officers carry out the p t health duties of Saigon, boarding and inspecting ships, etc : they have an adequate subordin e staff. In addition, a doctor at Cap St. Jaques and another at Mytho, both places on the a coast at the mouth of the river, assist in the discharge of port health duties in case of need. Te pilots, which board vessels bound for Saigon before they enter the river, assist in the carry g out of port health regulations : in case of doubt they summon one of the medical officers. The is no traffic up or down the river at night time, except mail steamers.

The fumigation of ships is carried out by means of a Clayton apparatus mounted on a ligh r. Sixty-two ships were fumigated in 1921.

There is a quarantine station or lazaret at Nhabe, 12 kms. below the town of Saigon, on e right bank of the river. This quarantine station is well placed opposite a wide bend of the riv which contains sufficient water for the anchorage of quite large ships. There is accommodat n at Nhabe for about 315 passengers : this accommodation is good. Hospital provision, bathing a d disinfecting plant are alike quite adequate. The station is in the charge of a resident super tendent; there is also a resident medical officer when the station is being used. The whole est lishment was in admirable order at the time of inspection.

During 1921, 874 steamers, 12 warships and 297 junks were inspected and given *pratiq*

It is not possible here to say very much about the town of Saigon, the commercial and r i dential centres of which are well built and well laid out. The adjacent town of Cholon has e n a larger population than has Saigon. The advisability of bringing both these towns under he municipal administration has long been discussed. In both towns there are numerous in i tutions of interest and importance from the health view point, which were visited. First a d foremost should be mentioned the Pasteur Institute of Saigon, to which brief reference has b n made above. There are two large European hospitals, one containing accommodation for 2 0 patients, the other for 656 patients. The large native hospital has 380 beds : here there is a sch l

nurses. There is an admirable ophthalmological hospital and clinic with 56 beds. The ternity hospital and school for midwives in Cholon is extremely well installed and doing most mirable work. The infectious diseases hospital has accommodation for 296 patients. The new gon polyclinic is very well installed and doing great work. Several institutes in the neighurhood were also visited : special mention should be made of the lunatic asylum at Bienhoa, ich is perhaps one of the best institutes of its kind in the East.

Haiphong.

Haiphong is a comparatively new port situated near the mouth of the Red River. It is not ideal port on account of the difficulty of access, to which reference has been made, and it somewhat surprising that a better situation could not have been found in the near vicinity. is the outlet of the rich valley and fertile districts of Tonking, and acts as the port of Hanoi, ich is now the capital of French Indo-China, and with which it is connected by river, road and l. It is a rapidly developing town and is already an industrial centre of some importance. ere is a large and well-known cement factory, a chemical factory and rice mills. The wharves d quays are on the right bank of the river. The new port warehouses and stores are well nstructed. Though the trade of Haiphong has increased considerably in recent years, its lume of trade is still less than one third of that of Saigon. In 1921, 432 ships left Haiphong, d the total tonnage of merchandise entered and cleared, including local traffic, amounted to 72,444 tons.

Port health work is carried out under the direction of the chief medical officer of the Haiphong spital, assisted by a "médecin arraisonneur", an inspecting and boarding officer.

On the opposite bank of the river there is a quarantine station which is capable of accomodating about 140 persons. The buildings constituting this quarantine station are somewhat to close together, but in other respects they are very suitably designed for the purpose for ich they are intended. The whole station is very well kept and was in excellent order at te time of inspection. The steam disinfecting plant is perhaps somewhat too small. The thing accommodation is adequate. Accommodation is provided for the isolation of cases infectious disease. On the whole, the station is quite satisfactory, and with the improvents now being made, it should be quite adequate to meet the needs of Haiphong.

The port is provided with a Clayton apparatus mounted on a lighter for the fumigation of ips. This is a large apparatus, type B, and was in good working order. There is sufficient bordinate personnel for the adequate discharge of the health activities of the port; pilots and her port officials assist in the carrying out of port health regulations. During 1921, 522 ships d 470 sea-going junks were inspected. No infected ships arrived in port during the year and persons were detained in the quarantine station.

The water supply of the port appears to be quite satisfactory.

Any bacteriological work that may be required to be done is carried out at the laboratory the military hospital at Haiphong, which is situated in close proximity to the port area.

The two subsidiary ports of Tonking, Hongay and Moncay, are, in so far as port health work concerned, each in the charge of a part-time medical officer. There is no quarantine station in longay, but there is a small *lazaret maritime* in Moncay. At Hongay there is a Clayton apparatus, type H, on wheels, which could be placed on a lighter if necessary: at Moncay there is a mall Clayton apparatus, type M. Two hundred and one steamers entered the port of Hongay i 1921; no sanitary measures were called for. At Moncay 219 ships and junks were inspected uring the year. No epidemics prevailed at either port.

At Kwangchow Wan a French medical officer acts as part-time health officer. The port is ovided with a Clayton apparatus. During 1921, 305 ships were inspected. There is no quaratine station here. Local health authorities consider a quarantine station necessary, as the ort is in close communication with Hongkong : about 20 steamers a month arrive at Port Bayar om Hong-Kong.

The Ports of Annam.

As has been stated, the numerous small ports along the coast of Annam are of importance ly from the view point of coastwise traffic. The medical work at the ports of Tourane, Quinhon d Phanthiet is in each case directed by a medical officer, and there are 29 sub-agencies of the olice Sanitaire Maritime along the coast of Annam. There were formerly "lazarets maritimes" both Tourane and Quinhon. The former was destroyed by a typhoon and the latter has recently een repaired. It is very small but quite sufficient for the needs of the port. As a matter of ct, the limited amount of overseas trade of these ports hardly necessitates a quarantine station either place; this is the view expressed locally.

During 1921 one case of cholera was discovered on board a boat from Saigon : the boat was uarantined for seven days and the crew were vaccinated. One case of typhoid fever was also und on a steamer; the usual measures were taken. Eight cases of cholera were discovered on oard a ship from Cochin-China among a ship's company of 57.

The Ports of Cambodia.

In Cambodia the only river port of any great importance is Phnom Penh, whose plague experences have been described in some detail above. The port health work is under the direction f the local director of public health, assisted by a medical officer and an assistant. During 1921

only 44 foreign steamers visited Phnom Penh : 34 of these came from Manila, 8 from Singapo and 2 from Hong-Kong. All these ships were engaged in the cattle trade.

The inspection work carried out by the port health staffs in the whole of French Indo-Chir during 1921 was as follows : 4,218 steamers, 28 warships, 58 sailing ships and 9,165 sea-goir junks.

All Asiatic immigrants into Indo-China are medically inspected and vaccinated again: smallpox before admission, either at the port of departure or on arrival. Immigrants from Hon Kong are vaccinated also against plague before they leave that port.

The port health regulations of French Indo-China are based in the main on the Internation Sanitary Convention of Paris. There are, however, considerable modifications which have bee necessitated by local conditions and circumstances of trade. The regulations are compara ab in most of the French colonies; they are detailed in the Decree of June 7th, 1922, which wa published in the *Journal officiel de la République française* under date June 11th, 1922.

XIX — SIAM

The inquiry into health conditions of Siam was of the briefest possible description and was carried out during the Far East Conference of the League of Red Cross Societies in Bangkok, in November-December 1922. It was the writer's intention to revisit Siam on the return journey; unfortunately, time available made this impossible, and in consequence the following brief note is not as detailed as it might be.)

Siam is situated in the centre of the Indo-China peninsula, and lies between 97° 25′ and 05° 30′ east longitude. It extends northward as far as 20° 30′ north latitude, and its southrn province extends southward into the Malay Peninsula, where it has a common frontier ·ith the Malay States. Practically the whole coast-line of the Gulf of Siam thus lies in Siamese ·rritory. In addition, Siam possesses a considerable seaboard on the southern part of the eastern ıore of the Bay of Bengal. French Indo-China lies across its eastern frontiers, and Burma djoins it on the west.

The northern part of the country is mountainous. The most densely populated and fertile reas of Siam lie along the valleys of the great rivers. Here the rice, on which the prosperity f Siam so largely depends, is cultivated. In the towns and villages along these valleys, rivers nd canals are the most common means of communication. Recent years, however, have seen nsiderable developments in railway construction. The southern line connects Bangkok, the ıpital, which lies near the mouth of the Menam River, with the railway system of the Federated lalay States. A Northern Railway line runs from Bangkok almost as far as the northern frontier f Siam, and an Eastern branch line extends almost to the frontier of French Indo-China.

Population.

The population of Siam approximates 8,000,000. The first census of the whole country ·as taken in 2452 B.E. (1909-10). The enumeration outside Bangkok was made by the district fficers of the Ministry of the Interior, who entered in registers the names of each individual, ɔgether with details concerning age, sex, religion, occupation, number of cattle, carts, boats, etc. hese registers are kept up to date by the local authorities by notifications of births, deaths and ıigrations, and checked each year by a more or less detailed enquiry. The revised census figures ublished for the year 2453 B.E. (1910-11) gave a population of 8,149,487, of whom 4,101,637 ·ere males. The figures seem to show that the natural rate of increase of the population pproximates 11 per thousand per annum.

Administration.

For administrative purposes, Siam is divided into 17 circles, which are further subdivided ıto 78 provinces, consisting of 409 districts and containing 5,042 communes. The total area of iam is 484,128 square kilometres, which indicates an average density of population of 17 per quare kilometre. The density of population varies between 214 in Krungdeb, the circle in which ɔangkok lies, and 5 in Bejra Burana.

Public Health.

Developments during the last fifty years have been rapid. During recent years considerable ttention has been paid to sanitation and medicine. In spite of this, however, Siam, outside f Bangkok, is still in a somewhat backward condition from the point of view of health activity.)utside the capital city there are less than 200 qualified physicians, including those employed ıy the Government and health organisations, to serve the needs of a population of 8,000,000

There is in Bangkok a Department of Public Health, which is subordinate to the Ministry f the Interior. This department was created in 1918, and absorbed the pre-existing Departıent of Public Welfare and the older Medical Department of the Interior. At present the Departıent of Public Health is responsible for the health administration of the interior provinces and ealth questions of national importance. The health administration of Bangkok city does not t present come within its sphere of activity.

The head of the Public Health Department is known as the Director-General, under whom here is an Assistant Director-General and an advisory staff. The Chief of the Health Section f the department is responsible for central administration; educational work, such as popular ealth propaganda; general public health activities, such as control of epidemic diseases, laboraories, sanitation, inspections and the registration of vital statistics and of cases of communiable disease; quarantine at river ports; inspection of medical institutes, etc.

There are three types of administrative areas considered from the health point of view. In the first place, there are rural districts, which are administrated under the Local Administration Law of 2457 B.E. (1914). In the second place, there are areas administered by local boards under the general supervision of local administration authorities and the Ministry of the Interior; and thirdly, there is Bangkok, the only large city, in the modern sense, in the kingdom.

A very important role in the public health activity of recent years has been filled by the Siamese Red Cross Society. This society is in certain respects almost unique among Red Cross societies. It has had relatively very large funds at its disposal, which it has used wisely in the cause of public health. The hospitals and research institute in Bangkok, which owe their origin to Red Cross initiative and enterprise, are extremely well, even lavishly, housed and equipped. The Red Cross Society has been in charge of the hookworm survey of the country, which was initiated here, as in many other countries of the Far East, by the International Health Board of the Rockefeller Foundation. This work has, since the writer's visit to Siam, been handed over to the Health Department of the Ministry of the Interior.

Vital Statistics.

The amount of reliable statistical information and information of a general nature regarding health conditions in the provinces outside Bangkok is not very large. Throughout Siam, the registration of births and deaths is legally compulsory, but efficient registration is extremely difficult to carry out in the conditions prevailing. The Census Law (2452 B.E.) and the regulations thereunder, promulgated in 2459 B.E., make it incumbent on all householders to report births to the headman of the village community within a period of fifteen days. Deaths have to be reported in the same manner within a period of twenty-four hours. The headman registers these births and deaths and issues certificates. Fines are inflicted for failure to register. If the headman has reason to suspect homicide, he reports the circumstances to the executive of the local administration. If there be suspicion of infectious disease, the headman reports to the executive of the Infectious Disease Law. No burial is permitted without a certificate. The Law for the revision of the Census (2460 B. E.) makes provision for the appointment of registrars.

In municipalities (*Sukhabhipal*) the procedure is a little different. Here the householder reports the circumstances direct to the *Sukhabhipal* physician, and the information thus acquired finds its way through the district officer and the Governor of the province to the Department of Health in Bangkok. Outside Bangkok, there are 25 *Sukhabhipals* in Siam, with an aggregate population of 107,000.

In spite of the regulations, which appear to be both simple and adequate, the death returns from the provinces of the interior, as well as from the municipalities, are at present very incomplete. According to the returns of 2464 (1920-21), the rural populations of Siam had a birth-rate of 28 per mille and a death-rate of 16 per mille. In the municipalities, excluding Bangkok, the birth-rate approximated 19 and the death-rate 20 per mille.

Infectious Diseases.

The Infectious Diseases Law (2456 B.E.) provides for the compulsory notification of plague cholera, smallpox and cerebro-spinal meningitis. From the point of view of the present inquiry plague is of chief interest and importance.

Smallpox.

Smallpox occurs frequently, and the official figures indicating cases and deaths are undoubtedly a considerable under-statement. The vaccination laws are well drafted. If the Minister of the Interior considers it necessary, he may issue a public notice requiring vaccination or re-vaccination of all the inhabitants of the locality within a specified time. The difficulties of communication in some of the more remote parts of the kingdom formerly made it difficult for supplies of vaccine to reach a threatened town or village in time to be effective. Recently, however, aeroplanes have been used for the transport of vaccine to out-of-the-way districts. In the year 1921-22, 460,000 vaccinations were performed. The average annual number of vaccinations performed each year during the past decade approximates 380,000.

Cholera.

During the two years 1919-21, over 18,000 cases of cholera were recorded. It will be remembered that these two years, more especially 1919, were years of unusual cholera incidence all over the East. The figures given above are greatly in excess of the normal cholera incidence in Siam.

Plague.

Plague first appeared at the end of 1904 in Bangkok, whither infection appears to have been brought from Bombay.

There is very little information regarding the incidence of plague in the districts outside Bangkok during the earlier plague years. In the year 1907, 305 deaths were recorded at Phi

athom, a rather important town which lies west of Bangkok on the Southern Railway line. ince 1913 more complete information is available. It appears that all the few towns and illages which have suffered from repeated outbreaks year after year are market centres; ney are all characterised by the presence of over-crowded, insanitary dwellings, and they are ll filled with merchandise. In other places which have been infected, the disease has quickly ied out. The report of the Department of Public Health in 1922 states that cookshops, paddy-odowns and hand rice-mills, stables, and insanitary and closely built houses about markets ave frequently been associated with plague in Siam.

The seasonal prevalence of plague in Siam has been characteristic : the months November o April have been invariably the months of maximum plague incidence in those villages and towns hich have suffered from repeated outbreaks; the remaining months of the year have been rela-ively plague-free.

It would seem, then, that plague in Siam, as in other countries of the Indo-China Peninsula, ersists and is spread with considerable difficulty, except in such places as harbour an excep-ionally large rat population. How severe the disease can be in such places, however, is exempli-ied by the experience of Korat. Korat is an important trade centre; it is the terminus of the astern branch of the Northern Railway lime. From 1913 to 1917, every year was characterised y an outbreak of plague in Korat, but the epidemic of 1917-18 was one of unparalleled severity. During that year nearly ten per cent of the population of the small town died of plague. Very nergetic measures were taken, and the disease was eradicated, since when Korat has been almost ompletely plague-free.

No epidemic of pneumonic plague has ever been reported in Siam. Some years back out-breaks were occasionally reported, but upon investigation these were all found to be plague of he septicæmic type. According to the report of the Department of Public Health, it appears hat terminal pneumonias are by no means uncommon in bubonic plague cases in Siam, as in ther countries.

Public Health Reports.

The first report of the Department of Public Health was published in 1922. The report n question contains a vast amount of most interesting information about the public health condi-ions of a country concerning which information was formerly somewhat difficult to obtain. The department can be heartily congratulated on its publication, and it is to be hoped that a similar report will appear annually in the future. Health problems in Siam have special diffi-culties of their own, and an annual statement of the progress made and of the improvements most urgently needed would be a valuable stimulus to renewed effort.

BANGKOK.

Bangkok, the capital of Siam, is situated on a bend of the River Menam, some 25 miles from its mouth. The greater part of the town is situated on the left bank of the river in low-lying deltaic country. Until a comparatively recent date, canals or klongs formed the main thorough-fares of the town. The houses along the banks of these klongs were constructed either on piles or on pontoons. Recently, however, numerous wide roads have been constructed and houses built of brick or other permanent material have in large part taken the place of the typical Siam-ese dwelling. Many of these roads are bordered with very fine trees and possess an admirable surface for motor traffic. Many klongs still exist, however, and the amount of merchandise that is carried by boat from one part of the town to the other is still very considerable. Most of the surface drainage goes into these klongs, which are tidal at certain seasons of the year.

The city covers an area of 10 square miles. The royal palace is situated in the centre of the town, which extends northward to parks and open spaces and southward to the business quarter and docks. The brightly coloured tiled roofs of innumerable Buddhist temples and palaces give Bangkok picturesque characteristics of its own and add greatly to its attractions.

The port of Bangkok consists of a four-mile stretch of the river immediately below the town. Here the river is between 250 and 400 yards in breadth. The water is deep right up to the shore, but a bar at the river mouth makes it difficult for ships drawing much more than 12 feet of water to gain access to the port. The banks on either side of the above area of the river, more especially the left bank, are lined by offices, warehouses, wharves belonging to commercial houses, timber-yards and innumerable rice-mills. Here, too, are situated several legations and consulates as well as the custom-house.

The portion of Bangkok on the right bank, the convex side of the bend of the river, has not been developed to the same extent as the rest of the town. Here there is the terminus of the railway which connects Siam with the Malay States. Roads there are none, and klongs are still the main thoroughfares.

Population.

The population of Bangkok is 324,422. Of these, 205,302 are Siamese and 102,569 are Chinese. All other nationalities aggregate 16,551. Among the Chinese population, males are more than three times as numerous as females. Among the Siamese, however, there are 106 females for every 100 males.

The health administration of Bangkok does not come under the jurisdiction of the Department of Public Health of the Ministry of the Interior; another department of the Government

is responsible for the municipal administration. There is a Medical Officer of Health, who, at the present time, is an American. Under the control of the Medical Officer of Health are the following institutions : a lunatic asylum; a central hospital, intended primarily for emergency surgical work, accidents, etc.; an infectious diseases hospital; an out-patient dispensary; a central laboratory and the prisons. The Medical Officer of Health is likewise in charge of the port health activities of Bangkok.

The main part of the city of Bangkok, on the left bank of the river, has an extremely good water supply. The water is taken from the River Menam, some 40 miles above the city, and is passed through an admirable mechanical filtration plant. Frequently bacteriological and chemical examinations are made of the water in the central laboratory. It is doubtful whether any city in the East has a better water supply than has Bangkok. An extension of the supply to the part of the city which lies on the right bank of the river is under consideration; this is very desirable.

Bangkok is not sewered; any comprehensive sewerage system would be at the present time prohibitively costly. The bucket system of night-soil removal is practised. The smaller klongs in the city function more or less as open drains.

From a health point of view, many of the houses that have been recently constructed are a great improvement on the older dwellings. There are, however, no adequate building by-laws. Scavenging appears to be efficiently carried out.

The public markets that were inspected are for the most part ill designed and not very satisfactory.

The city slaughter-house is good.

The rice-mills, which are very numerous, more especially in the southern part of the town, are, as is the case in the other important rice-exporting ports of the East, very heavily rat-infested. This is a matter of very considerable importance in view of the fact that Bangkok appears to be always infected with plague.

There are 19 Siamese medical officers under the supervision of the Medical Officer of Health; these include the doctors in charge of the various institutions enumerated above.

Births and deaths appear to be carefully recorded.

During the year 2464 B.E. (1921-1922) the number of births recorded was 10,209, which gives a rate of 31.4 per thousand for the population of the city as a whole.

For the Siamese part of the population alone, the very high birth-rate of 48.8 per thousand was recorded.

During the same year the deaths registered numbered 10,598, equivalent to a death-rate of 32.6. Of the causes of death the following are noteworthy. The number of deaths is noted against each :

Typhoid fever	126
Malaria	255
"Fevers"	1,029
Smallpox	1
Cholera	17
Plague	71
Dysentery	511
Diarrhœa and Enteritis	1,178
Beri-beri	372
Tuberculosis	1,371
Leprosy	35
Measles	89
Diphtheria and Croup	86

Plague.

Of the above diseases, plague is perhaps the disease of chief importance from the point of view of those countries having maritime trade relationship with Bangkok. During the present pandemic the first case of plague diagnosed in Bangkok was in December 1904. This is of interest when it is recalled that Burma and Cambodia, the two countries on either side of Siam, were first infected much about the same time. Between 1905 and the present time no year has passed without a certain number of plague cases having been reported in the city. The annual totals of notified cases have been as follows : *1904*, 32; *1905*, 24; *1906*, 59; *1907*, 39; *1908*, 51; *1909*, 168; *1910*, 103; *1911*, 106; *1912*, 48; *1913*, 58; *1914*, 43; *1915*, 298; *1916*, 240; *1917*, 147; *1918*, 179; *1919*, 51; *1920*, 28; giving a total for the seventeen years of 1,722.

During the year 2464 B.E. (1921-1922) the monthly incidence of plague mortality has been as follows :

April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March
7	4	3	1	10	0	2	1	5	11	15	12

From the above figures it will be seen that plague has not been a serious cause of either morbidity or death in Bangkok, in spite of which fact the disease has persisted with marked tenacity. In these respects the history of plague in Bangkok is very similar to its history in Singapore, Saigon and the coastal towns of the Dutch East Indies, and it would seem probable that here, as in the other towns mentioned, the figures representing the causes and deaths ascribed to plague are a very inadequate index of the rat epizootic. Considering the low incidence of human cases, the seasonal prevalence has been remarkably constant and characteristic, though cases occurred

n all months of the year. The plague mortality curve begins to rise in December and reaches ts height in the month of March, after which there is a more or less rapid decline. October and November are the months of lowest plague incidence.

If one excepts the more recently constructed buildings, there are few towns of its size which afford more shelter for rats than does Bangkok. Many of the older dwellings have their floors aised a few inches above the ground, and in this space the rat finds admirable shelter. The rice-nills have already been referred to; the large wholesale stores attached to these mills shelter and eed rats in enormous quantities. The Health Department devotes some attention to rat destruction and to rat examination. The scale on which rat trapping is carried on is insufficient to ıave any appreciable effect on the rat population, but it is very rightly considered that measures ıf this kind have an educative value. During 2464 B.E., 5,987 rats were examined in the central aboratory. Of these, seventeen were found to be infected, twelve *R. norvegicus*, two *R. rattus*, nd two *R. concolor*. *R. norvegicus* (*decumanus*) appears to be the most prevalent rat in Bang-ok, a fact which may explain in part the failure of human plague as an index of the epizootic.

Cholera.

During 2464 B.E., notified cases of, and deaths from, cholera in the province of Bangkok umbered 56 and 17 respectively. These cases were all sporadic and a death or deaths were ecorded in ten of the twelve months of the year. As in most other countries and towns of the East and the Far East, cholera was unusually virulent in the year 1919. The number of cases and eaths recorded in B.E. 2462 (1919-1920) was 2,999 and 2,557 respectively. In 2463 B.E. the igures were 1,360 and 930.

In view of the admirable water supply, to which reference has been made, there is now little, any, risk of epidemic cholera on a large scale in those parts of Bangkok which are situated on he left bank of the river; other parts of the town are in greater danger. Incidentally, it may e remarked that when Bangkok was visited in November and December 1922 the comparative bsence of the house-fly was remarkable, in spite of the fact that what would be in most places uitable breeding places for flies were by no means very difficult to find.

Smallpox.

From the list reproduced on the previous page, it will have been noted that there was only ne death attributed to smallpox in 2464 B.E. Smallpox does not now appear to be an appreiable cause of either sickness or death; vaccination receives considerable attention. During the ix years 2459—2463 B.E., the cases and deaths attributed to smallpox were as follows : 5 and ; 49 and 23; 21 and 10; 4 and 0; 5 and 1; 4 and 1. The number of vaccinations performed uring each of these years has ranged between 30,000 and 40,000. Primary vaccination is ompulsory in Bangkok.

Port Health Procedure.

The chief Port Health Officer of Bangkok is the Medical Officer of Health of that city. The ort health regulations are contained in the Law of Navigation in Siamese Waters, 2456 B.E. Whenever information is received regarding the prevalence of plague, cholera, smallpox, fever or ther disease in any port outside Siam, it is lawful for the Minister of the Local Government o declare such port an infected port and to take measures accordingly. All ships coming from uch a port are inspected and measures taken in accordance with the conditions found. Any hip on which a case of dangerous infectious disease has occurred is similarly treated.

At the island of Koh si-Chang, in the Gulf of Siam, outside the bar of the Menam River, is the ustoms station. An assistant port health officer is stationed there; he inspects all ships from ıfected ports and may, if he consider it necessary, order the ship to the adjacent island of Koh 'hra, on which is installed a quarantine station. This station was not inspected during the tour. 'here is accommodation for a large number of deck passengers in case of need. The station is ot very often used and the equipment was somewhat inadequate. Considerable improvements ave, however, quite recently been carried out.

The chief quarantine inspection station is situated at Paknam, on the mainland, on the east ide of the mouth of the Menam River. All ships from infected ports are inspected here. If ıeasures be necessary the Port Health Officer in Bangkok is informed and the vessel is ordered to he quarantine anchorage. There is a quarantine anchorage also in the port of Bangkok. Har-our officials and customs officials assist by seeing that the provisions of the quarantine law are uly carried out.

The number of ships examined at the various quarantine stations during the year 2464 .E. was thirty, with crew and passengers numbering 1,522 and 2,296 respectively. Three of these hips were found to be infected with smallpox. It was not necessary to send any ship to the uarantine island of Koh Phra during the year.

XX — BRITISH INDIA

The time available for the Indian part of the tour was altogether inadequate for as com prehensive an enquiry as has been made in certain other countries of the Far East.

Moreover, unforeseen delays in the earlier part of the tour resulted in the journey acros India being made in excessive heat at the most unfavourable season of the year, just before th monsoon rains had become established. In such circumstances much less was accomplished i India than the writer originally intended. The tour was confined to visits to Rangoon, Calcutta Simla and Bombay. In spite of this the amount of available material of interest from the poin of view of the present enquiry is so considerable that necessary condensation is a matter of som difficulty. The writer's intimate acquaintance with certain of India's health problems of direc concern to the subject-matter of this report adds to, rather than detracts from, the difficulty o such condensation. Statistical data are cumbersome when they apply to a territory so vas as British India, with its population of over 300,000,000.

Approximately one-third of the area of British India and one-quarter of the population belon to native States; the remainder is divided up among the various presidencies and provinces o British India, the chief of which are :

Provinces of British India	Population 1921 Census
Bengal	46,522,293
Bombay	19,165,614
Madras	41,036,975
Punjab	20,517,606
United Provinces	45,375,787
Bihar and Orissa	34,922,189
Central Provinces	13,914,821
Assam	7,575,667
North-West Frontier Province	2,135,573
Burma	13,205,564

The administration of the Indian Empire is in the hands of a Governor-General and Counci with Legislative Assemblies, whose headquarters are at Delhi and Simla.

The Director-General of the Indian Medical Service is the adviser in medical matters to th Central Government. The Public Health Commissioner with the Government of India is th technical adviser to the Government in all questions of public health and disease prevention. H secures the necessary co-ordination between the public health activities of the various province

The provinces of India are autonomous in all matters pertaining to local affairs. Each o the larger provinces has a Governor and Council. Provincial medical matters are administere by a provincial "Surgeon-General" or an "Inspector-General of Civil Hospitals", as the case ma be. In each province public health matters are supervised by a provincial Director of Publi Health, who is the technical adviser to his Government; he is assisted by a varying number o Deputy Directors, each with a portion of the province allotted to his special care.

Most provinces of India are divided into divisions, which are again subdivided into district the size of which varies much in different provinces. In the United Provinces the average popu lation of a district is about a million—a high figure. These districts possess district board and some of these boards employ a district health officer, who is in charge of the rural sanitatio of the district. Such appointments are quite recent and mark a welcome step forward in dealin with that all-important and difficult subject of rural "sanitation" in India. All the larger town possess municipalities, with health officers and staffs of their own.

In each district there is a civil surgeon who is responsible for the administration of the hospi tals and dispensaries of the district, over which he exercises supervisoy control, and is in direc charge of the district headquarter hospital. Till recently the civil surgeon was also the onl health officer of the district. The civil surgeons are under the orders of the provincial surgeon general or the provincial inspector-general of civil hospitals, as the case may be.

All the larger provinces possess research institutes or Pasteur institutes, the administratio of which is in most cases under provincial control. All the larger provinces possess medical col leges, and there is a medical faculty belonging to each of the larger universities.

Lunatic asylums and such institutions are under the chief of the provincial medical depart ments.

The Gaol Department is also a branch of the medical service. There is an Inspector-Genera of Prisons in each province; he is in each case an officer of the Indian Medical Service, and th superintendents of nearly all large gaols are likewise medical officers.

This condensed summary of medical administration and organisation may convey some ide of the lines on which medical and public health activity has developed in this huge country As to the amount of work done, the following figures may give some indication. In 1919 ther were in the thirteen provinces of British India 3,227 state public, local-fund and private-aide civil hospitals and dispensaries, in which 35,078,305 patients were treated; of these, 636,934 wer in-patients.

Before dealing with health conditions in the chief ports of British India and their neighbourhood, it would be well to discuss briefly the incidence of plague in India as a whole and certain other matters of importance which are common to all ports in the country. From the point of view of countries having maritime trade connection with India, it is undoubtedly plague that is of chief interest at the present time. Cholera and smallpox are referred to in the sections of this report dealing with Bengal, Burma and the Bombay Presidency, the provinces which possess India's most important ports.

Plague in British India.

In 1918, the writer of this report, then in the service of the Government of India, published a memorandum entitled "Twenty Years of Plague in India", in which the evolution of plague was described from the beginning of the pandemic up to the end of the 1917-18 epidemic (1). It was pointed out that there were then indications that the disease was decreasing in virulence in most of the severely infected areas of British India. It was argued that that decrease in virulence was due to an increasing immunity to plague of the rat population in such areas and that it could in no wise be attributed to increased efficiency of plague preventive measures. There was experiental evidence of such increased immunity to plague of the rat population in several plague-stricken areas of India. The history of plague during the four years that have elapsed since that report was written has given support to this contention.

The incidence of plague mortality in India in the four quinquennial periods between 1898 and 1918 was as follows :

1898-1903	1,707,456
1903-1908	4,325,237
1908-1913	2,042,127
1913-1918	2,179,401
TOTAL	10,254,221

The combined mortality of the four plague epidemics that have supervened since June 1918 is only 402,295—a figure which is less than the average annual plague mortality of the 24-year period now under consideration.

If the contention put forward in 1918 were justified—that the decreasing prevalence of plague was due to an increasing immunity of the rat population—the rate of decrease since then should have been much greater in those provinces of British India that have suffered most from plague than in the more lightly affected provinces. Striking evidence of this is afforded in the following table, which gives the total plague mortality of each of the 24 epidemics in each of the twelve chief plague-infected administrative areas of British India :

Total Plague Deaths recorded each Year in British India, and in each of the more important plague-infected Administrative Areas of British India, from July 1898 to June 1922.

		ADMINISTRATIVE AREAS				
	British India Totals	Punjab	United Provinces	Bombay	Bihar and Orissa	Central Provinces
1898-1899	119,045	222	1	97,957	85	246
1899-1900	143,208	536	140	99,796	21,547	1,058
1900-1901	162,379	5,793	7,834	46,125	76,074	8
1901-1902	514,141	217,724	27,620	206,962	19,408	459
1902-1903	768,683	215,350	79,476	308,938	57,335	29,057
1903-1904	1,138,451	419,050	138,942	328,056	62,945	61,135
1904-1905	1,328,249	414,219	434,217	216,205	127,672	15,865
1905-1906	311,945	89,307	60,799	64,271	56,533	14,986
1906-1907	1,286,513	675,307	341,725	101,768	82,009	39,252
1907-1908	260,079	49,740	26,649	114,184	16,016	9,847
1908-1909	126,442	37,932	14,252	34,686	6,042	7,965
1909-1910	495,151	168,805	156,323	33,894	41,295	32,885
1910-1911	792,348	209,469	348,548	52,392	76,844	29,359
1911-1912	432,505	35,664	121,237	105,491	60,869	28,986
1912-1913	195,681	19,480	99,928	20,722	31,301	980
1913-1914	311,415	61,595	117,440	38,399	69,662	10
1914-1915	407,333	256,990	59,534	27,594	27,745	12,439
1915-1916	207,353	4,177	45,681	65,693	23,512	18,394
1916-1917	433,008	5,265	108,083	137,864	39,095	46,195
1917-1918	820,292	105,459	197,803	194,224	59,763	29,515
1918-1919	104,806	11,250	17,556	19,383	16,520	3,220
1919-1920	128,047	6,552	23,483	12,344	18,682	17,972
1920-1921	107,029	1,959	25,374	9,926	17,202	4,149
1921-1922	62,413	7,876	12,039	4,606	8,559	7,561
TOTALS	10,656,516	3,019,803	2,464,784	2,341,480	1,016,714	411,543

(1) In writing of plague in India it is more convenient to make use of the "plague year" rather than the calendar year—the plague year extending from July 1st to June 30th of the following year. The end of the calendar year in most Indian provinces synchronises with an important stage in the evolution of plague epidemics, while the period June-July in most provinces is a period of more or less complete plague quiescence.

	ADMINISTRATIVE AREAS						
	Hyderabad	Rajputana	Mysore	Madras	Central India	Burma	Bengal
	—	—	—	—	—	—	—
1898-1899	4,361	13	12,259	1,884	3	1	1,889
1899-1900	5,300	26	5,120	849	1	4	8,953
1900-1901	110	175	16,095	1,156	—	2	8,679
1901-1902	1,508	153	17,613	7,741	—	1	7,722
1902-1903	18,974	1,330	29,720	13,028	5,958	8	8,664
1903-1904	29,714	12,808	22,533	15,570	35,472	3	5,179
1904-1905	19,857	39,883	19,564	13,686	13,284	1,573	9,140
1905-1906	2,608	1,455	3,688	2,865	2,465	7,249	3,050
1906-1907	619	4,104	5,104	692	17,168	10,633	3,762
1907-1908	3,135	8,808	14,859	4,135	2,918	6,936	1,873
1908-1909	1,506	5,793	5,023	2,523	1,231	7,285	2,164
1909-1910	661	39,254	4,307	3,674	4,714	7,576	1,431
1910-1911	7,709	27,558	9,327	8,143	12,734	6,513	1,882
1911-1912	27,841	2,282	15,056	16,044	13,047	3,357	2,118
1912-1913	3,751	5,778	4,359	3,908	329	3,722	1,048
1913-1914	3,319	1,426	4,174	6,456	315	7,610	598
1914-1915	3,086	175	5,912	2,993	2,940	4,769	233
1915-1916	27,465	37	4,366	6,698	2,437	7,409	115
1916-1917	53,843	6,502	12,940	13,649	5,300	6,167	158
1917-1918	37,245	119,488	10,457	26,986	21,482	9,984	277
1918-1919	6,822	295	6,746	6,346	1,554	4,982	432
1919-1920	20,861	42	5,269	6,875	3,972	5,464	77
1920-1921	9,404	849	9,675	18,217	374	3,964	58
1921-1922	733	4	6,771	7,179	239	6,517	136
TOTALS	290,423	278,238	250,937	191,297	147,937	111,659	69,641

Considering India as a whole, the plague epidemic of 1921-1922 was much the mildest experienced since plague obtained a foothold in the country; never before had the annual mortality for the whole of India fallen below 100,000, and in the year in question it was only 62,000. The average mortality of the last four epidemics is only 100,000. In the four administrations that have suffered most from plague—the Punjab, the United Provinces, Bombay, and Bihar and Orissa—the diminished prevalence of plague has been even more marked during the last four years than it has in India as a whole. The years 1920-1921 in the Punjab and 1921-1922 in the United Provinces were years of record low plague mortality. In the Bombay Presidency the mortality of each of the last four outbreaks, successively, has established a record from the same point of view.

On the other hand, in the provinces that have been conspicuous by reason of the mildness of their plague epidemics, typified by Madras and Burma, the plague mortality rates of the last four epidemics have not been appreciably below the mean rate of the 24-year period. In 1920-1921 the plague mortality in the Madras Presidency was higher than that of any other Indian administration, the United Provinces alone excepted. In the same year Burma had more plague than had the Punjab. This reversal of the usual order of things is of considerable significance.

The two graphs on page 145 (Diagrams Nos. 1 and 2) are of interest. They compare the annual incidence of plague mortality in the Punjab, which has suffered most, with the annual incidence in Madras and Burma, two provinces that have suffered relatively very little, from the date of first infection till the end of June 1922. The first graph indicates the actual "size" of the epidemics in these provinces; the second graph is a logarithmic curve designed merely to show the rate of decrease or increase, as the case may be. The inference is justified that plague in the Punjab exhibits a very well-marked continuous tendency to diminished prevalence, in spite of violent annual fluctuations in the plague mortality figures. On the other hand, in the Madras Presidency and Burma there is at present no indication whatever of any tendency towards diminished plague prevalence.

Bengal has remained all but plague-free; what little there has been has been more or less confined to Calcutta.

A few further facts indicative of the diminishing prevalence of plague in India as a whole are worthy of note. Between November 1900 and May 1921, no month passed in the Punjab without some plague deaths being reported; during June, July and August 1921 not a single death was ascribed to plague anywhere in that province.

The total plague mortality in the United Provinces in July 1921 was only five—much the lowest monthly figure recorded since plague became established in the province.

For the Bombay Presidency the monthly plague mortality fell below 100 on two occasions, namely : June 1921 and June 1922—an event unprecedented since 1897.

Rajputana is once more practically plague-free.

At the time of writing, complete figures for the outbreak of 1922-1923 are not available. In certain provinces of India the disease has once more been on the increase, and the plague-mortality bills have been considerably higher than during any one of the previous four years. The severity of the outbreak of 1922-1923, however, cannot be compared with that of the serious outbreaks of former years (1).

The tables that have been reproduced, and the graph illustrating the annual plague-mortality in British India during the 24-year period 1898-1922 on page 146 (Diagram No. 3), illustrate the

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(1) Approximate figures for the plague mortality of 1922-1923 are as follows
United Provinces, *54,000*; Punjab, *24,500*;
Bihar and Orissa, *22,500*; Bombay Presidency, *13,000*;
Central Provinces, *12,500*; Madras Presidency, *10,500*;
Burma, *7,500*; Delhi Province, *2,500*; Bengal, *100*.

Comparison of the Annual Incidence of Plague Mortality in the Punjab with those of Madras and Burma.

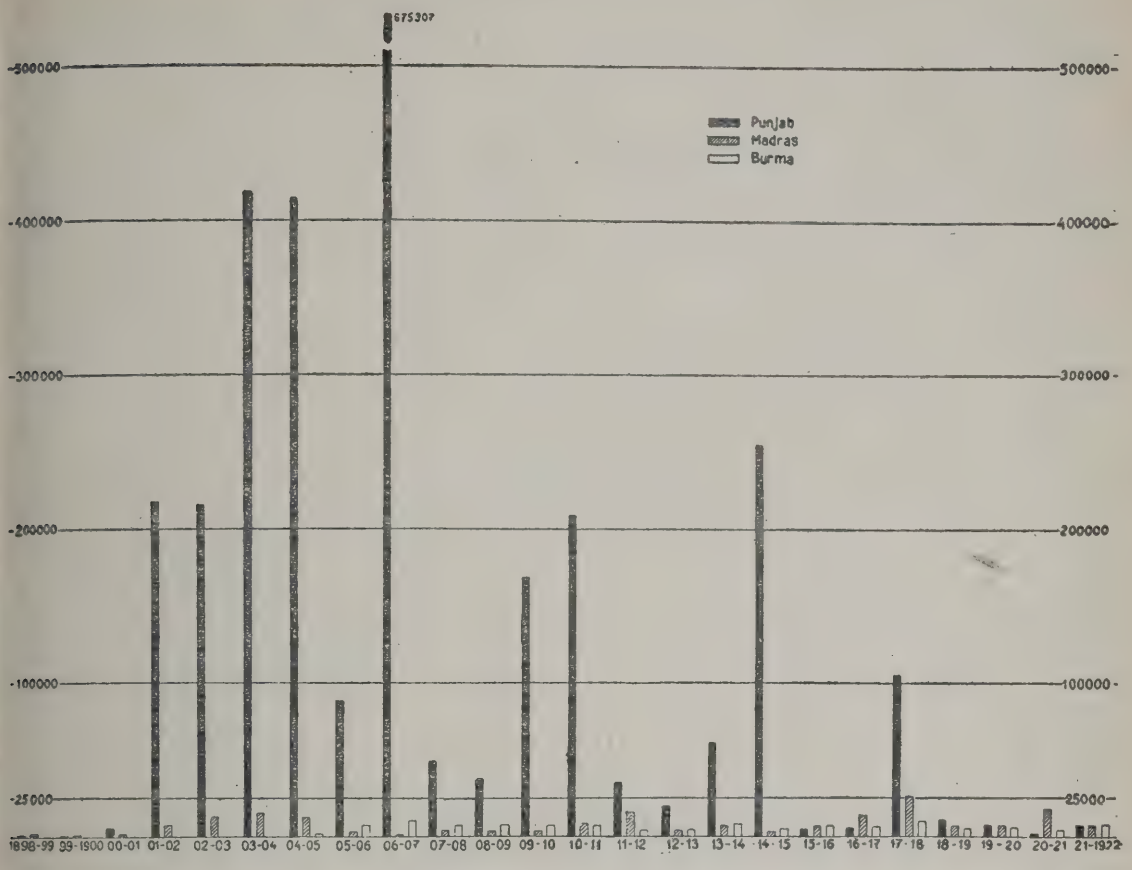


DIAGRAM No. 1. — Showing "Size" of the Epidemics.

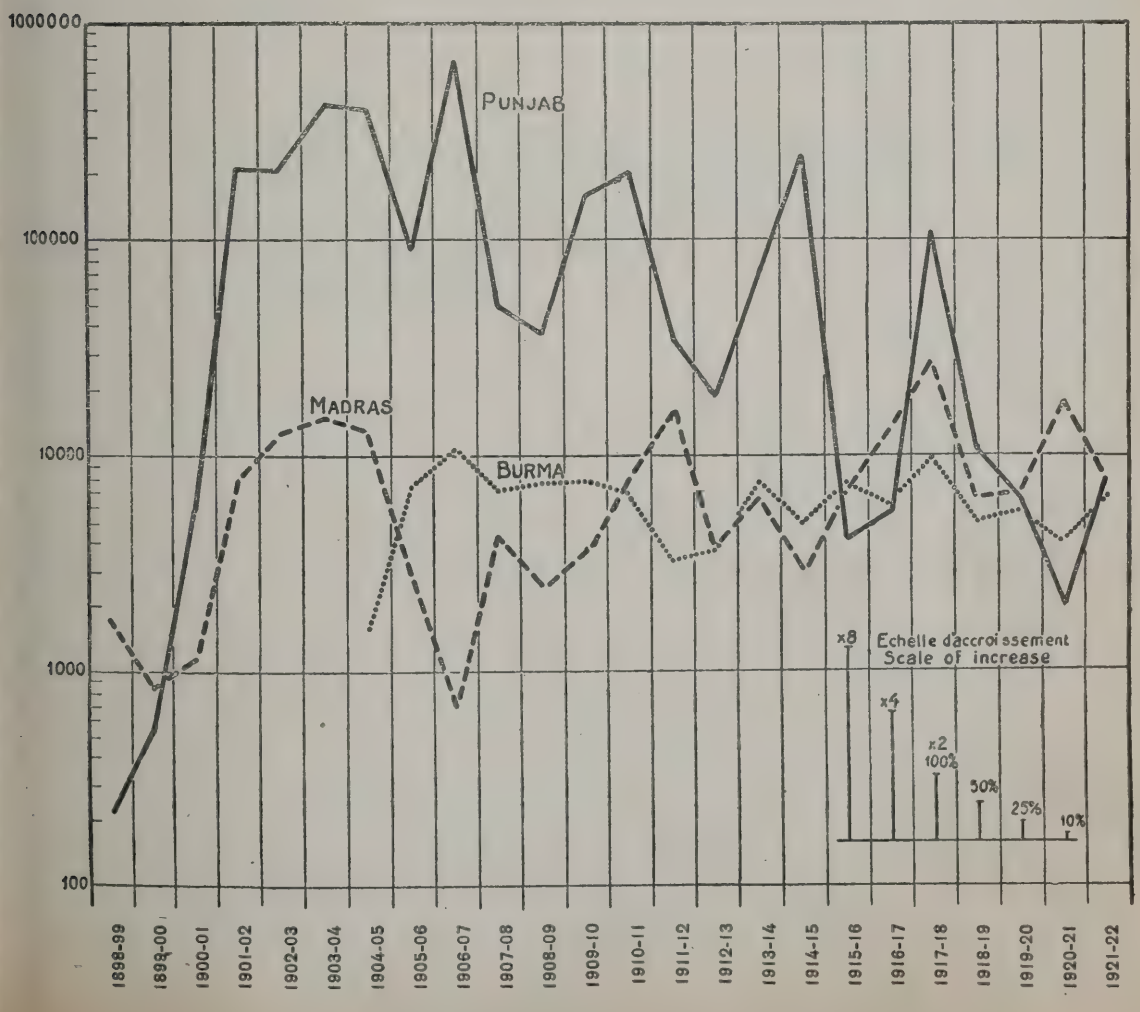
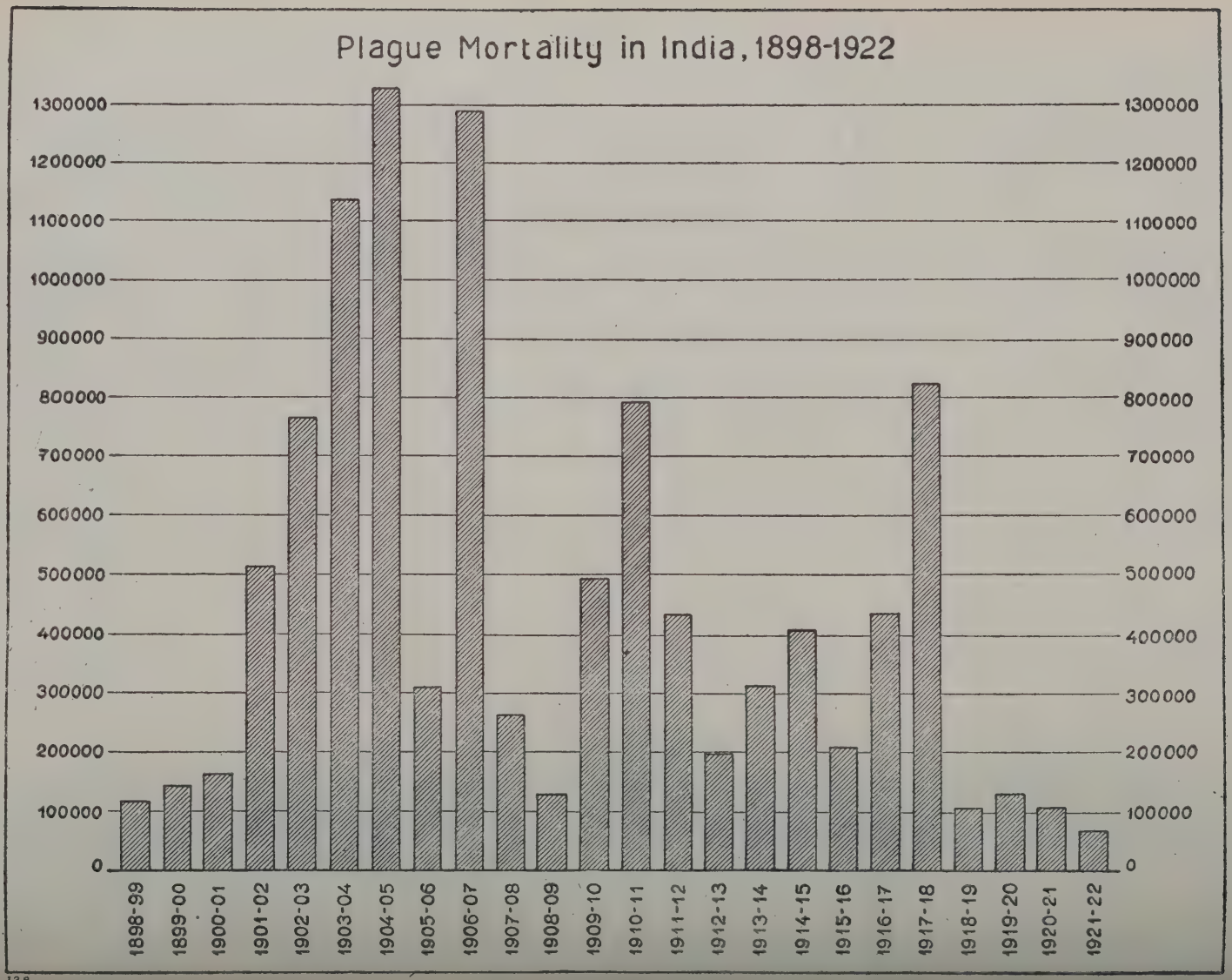


DIAGRAM No. 2. — Showing rates of increase and decrease of Plague Mortality.


Plague Mortality in India, 1898-1922
1300000
1200000
1100000
1000000
900000
800000
700000
600000
500000
400000
300000
200000
100000
0
1898-99
1899-00
1900-01
1901-02
1902-03
1903-04
1904-05
1905-06
1906-07
1907-08
1908-09
1909-10
1910-11
1911-12
1912-13
1913-14
1914-15
1915-16
1916-17
1917-18
1918-19
1919-20
1920-21
1921-22

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narkable variations in intensity that have characterised the outbreaks of different years—a riation that complicates the task of making a prognosis of the future behaviour of the disease British India. This task is further complicated by the fact that severe outbreaks of plague India are to a certain degree an expression of climatic conditions. In most parts of India nfall in excess of normal at certain seasons of the year, with the consequent increased humid- that this entails, ensures conditions favourable to the epidemic evolution of plague. High nospheric humidity at certain temperatures ensures conditions favourable to the development the rat-flea; it also, indirectly, favours the epidemic evolution of plague in several ways. As example of the factors that influence the correlation between high atmospheric humidity and gue mortality, the following may be cited : In the Punjab and the United Provinces it is a nmon practice to hold up stocks of grain until the winter rains are well established. If the ns be plentiful (with consequent high humidity) and the agricultural prospects promising, large ntities of grain are liberated and exported at a time when meteorological conditions are most ourable to the spread of plague. The added facilities thus afforded for the rapid diffusion of gue infection, by means of grain coming from and going to the rat-infested granaries of Northern lia, are of very great importance.

Taking all facts into consideration, there is unmistakable evidence that the prevalence of onic plague in India is on the wane. The plague situation in India is not so unmanageable w as it was a decade ago. The danger spots in each province are known—places in which ection persists, and from which infection spreads year after year. The dangers inseparable m the rat-infested markets and grain-stores, which, in spite of plague experience, still persist every province to the continued danger of the towns and villages concerned, are beginning to realised. The uncontrolled traffic in grain and other rat-favoured merchandise still continues, wever, to exercise its baneful influence, though each year provides striking evidence of the harm ne. All these things demand attention if plague is ever to be eradicated from India and India ot plague-free.

If increased immunity to plague of the rat population be indeed responsible for the lessened idence of plague, as appears almost certain, and if that immunity be a transmissible charac- istic, as one is almost compelled to believe, such immunity is likely to decrease in the absence plague. The susceptible rat will then have as good a chance of propagating his species as has l the more-favoured plague-immune rat hitherto.

Anything in the nature of a full discussion of plague preventive measures would be out of ce here; the question has been referred to in the chapter of this report which deals with the ject of plague in the Far East as a whole. Much more might be done than is at present being ne. Misdirected anti-plague measures in the early years of pandemic—of necessity misdirected, ng based on insufficient knowledge—have naturally produced discouragement, which is res- nsible for the *laissez faire* attitude adopted by some local authorities, that has been, and no lbt will be, most difficult to combat. British India is not alone in this respect.

The Ports of British India.

A glance at the map gives an idea of the enormous length of coast-line of British India. If t length of coast be considered in connection with the geographical distribution of disease the East, it will be realised that India's exceptionally difficult port-health problems are a matter much more than local interest and concern.

In comparison with the length of coast-line, large natural harbours and important ports surprisingly few. The five most-important ports are Bombay, Calcutta, Rangoon, Karachi d Madras. Of these, Calcutta and Rangoon are river ports, Madras port is purely artificial, d Bombay alone has a harbour that appears to have been expressly designed by nature for the chorage of large ocean-going vessels.

There are approximately two hundred small ports, a hundred of which are in the Madras esidency and 75 in the Bombay Presidency. These ports are of chief importance from the int of view of coastal traffic, but some of them are in direct trade relationship with ports of the Straits Settlements and of East Africa. At the time of writing, no detailed information is avail- le regarding the amount of this overseas traffic of the small Indian ports.

The time available during the Far East tour made it possible to visit only Rangoon, Calcutta d Bombay; these are the most important from the view-point of the present enquiry.

Much increased attention has been paid in recent years by the Government of British India questions of port-health procedure and equipment. The possibly increased danger of Asia coming infected with yellow fever consequent upon the opening of the Panama Canal brought s branch of public health activity into prominence.

In February 1920 the Government of India convened a "Yellow Fever Committee" which de a careful study of existing port-health procedure in India. The very important resolutions ich they adopted were accepted by the Government of India. These resolutions were published the Annual Report for 1920 of the Sanitary Commissioner with the Government of India. All these resolutions can be heartily endorsed, and, as many of them are of direct interest to the bject-matter of this report, brief reference to them is necessary.

Attention is directed in the first place to the omnipresence of *Stegomyia fasciata* along the ast of India and to the risks that India would run should the infection that exists on the west ast of Africa be conveyed to the east coast of that continent. The importance of prompt noti- ation of any extension of the disease is stressed. It is recommended that at each of the impor- nt ports in India a "sanitary station" be installed, providing facilities for the mooring of infected

or suspected ships, for the isolation of the sick, and observation of persons who do not rece pratique, and for fumigation and disinfection. The Committee considered that such fully equip stations should be provided at Bombay, Calcutta and Rangoon as soon as possible and that necessities of other ports should be considered. At each of these three ports a site for such sanitary station was selected. These sites were seen during the tour, and there can be no dou that, all things considered, the best available site was selected in each case. The Commit urged the importance of keeping the ports of India as free as possible from *Stegomyia* mosqui and made suggestions as to how this might be attempted.

In addition to considerations which are of chief importance from the yellow-fever point view, the Committee dealt with ship fumigation generally and with special regard to rat infes tion of vessels. It recommended that every vessel trading between India and European, Ameri and Australian ports be fumigated once in every round voyage. The difficulty sometimes ex rienced in fumigating a vessel in freight, occasioned by the absence of through ventilation holds, is made the subject of some pertinent remarks and suggestions.

One resolution has a direct bearing on proposals made in earlier chapters of this report deal with a "Sanitary Convention for the Far East" and a "Central International Epidemiologi Intelligence Bureau for the Far East". This resolution states : "The Committee feels stron that the defence of India from the introduction of dangerous epidemic diseases depends prima on the sanitary surveillance exercised over vessels during their stay in infected ports with wh India is in maritime relations, and that if absolute confidence could be placed in the efficiency this surveillance, and on skilled and reliable medical supervision throughout the voyage, th could be considerable relaxation of the measures to be employed on the ship's arrival." T resolution gives expression to a sentiment found in most countries of the East—a sentiment wh is primarily responsible for the present tour of enquiry in the East : it emphasises the importa of all necessary measures being taken at the infected port of departure—a desideratum wh has been underlined again and again in this report.

The above digression on the subject of the findings of the Indian Yellow Fever Commit has shown that at none of the Indian ports is there at the present time a "sanitary" or, as it is m usually called, "quarantine station". It has also shown that the necessity for such instituti is fully recognised locally and that the near future may see them installed.

Port Health Regulations and Procedure in the Ports of British India.

The health procedure at all Indian ports is governed by rules and regulations made in exer of the powers conferred by the Indian Ports Act (1908) as amended by the Indian Ports (Ame ment) Act 1911. These rules are at the present time undergoing revision. Through the court of the Government the writer was permitted to see the draft rules under consideration. I obviously impossible to discuss regulations that are not yet in force and almost equally unprofita to discuss at length rules that will shortly become obsolete. The matter is, however, of consi able importance from the point of view of the present enquiry and cannot be altogether ignor In the few remarks that follow, attention will be directed chiefly to such of the existing rule are unlikely to be changed materially in the process of revision. Such differences as exist betw the procedure laid down in the Indian regulations and that proscribed in the International Sanit Convention of Paris (amended proposals) are likely to be removed in the process of revisio

The Indian regulations apply to the following diseases : smallpox, chicken-pox, meas plague, cholera, yellow fever, sleeping-sickness, typhus fever, scarlet fever, jigger, and (by a rec notification) influenza and influenzal pneumonia. The addition of bilharziosis, cerebro-spi meningitis, diphtheria, and encephalitis lethargica to the list is contemplated.

Here it may be stated that certain of the above diseases are of little moment to the pu health of India. Typhus fever is apparently unable to exist, at any rate in epidemic form, in climatic conditions prevailing at any of the Indian ports, though the other louse-borne infect relapsing fever, is of common occurrence.

Epidemic manifestations of scarlet fever are exceedingly rare, if they occur at all, in the pla of India.

No indigenous case of sleeping-sickness has ever been reported in India, and the write unaware of the existence in India of any biting fly capable of transmitting the human trypanoso

Similarly with bilharziosis—a subject that has in recent years attracted much atten among medical authorities in India—none of the numerous species of the very rich Indian r luscan fauna appears to be capable of acting as the intermediate host for the human paras Very numerous cases of human bilharziosis were imported into India during the war, and i genous infections of the lower animals with closely allied species have been observed.

From the international point of view, the diseases of India of chief importance are pla and cholera. Smallpox is also widespread. The omnipresence of *Stegomyia fasciata* in abunda all along the coast-line necessitates careful consideration of the sufficiency of rules and regulat framed to prevent the introduction of the infection of yellow fever—a disease hitherto unkn in Asia. The complete eradication of *Stegomyia* mosquitos from the ports of India is not at any rate, nor is it likely to be in the near future, a practical proposition, though a diminu in their number to a safer level in the chief ports may well prove possible.

The rules in force contain definitions of "healthy", "suspected" and "infected" ships com able to those in the International Convention, in so far as plague, cholera and smallpox are cerned. With regard to yellow fever, any ship that has within the preceding two mo touched at a port infected with this disease is "suspected" unless it be "infected". Moreo all ships coming from the east coast of Africa between Durban and Port Soudan are "s pected" of sleeping-sickness and jigger unless they are infected.

Under the rules, an infected port means any port which the Government may, by notification, declare to be infected.

All "infected" and "suspected" vessels are inspected as soon as possible after arrival by the port health officer; he may examine passengers, crew, personal effects, cargo and any part of the vessel he may consider necessary. He may demand a declaration on oath from the master of the ship, or the ship's doctor, or both, regarding any sickness or rat mortality that may have occurred or been observed on the ship. As a result of the inspection, the port health officer classifies the ship as "healthy", "suspected" or "infected" and acts accordingly.

If an infected vessel has no communication with the shore (it is left to the health officer to decide what constitutes "communication"), and unless the disease be plague, the removal of a patient from the ship, if he be bound for an onward port, is not enforced unless under the strictest necessity, of which the health officer shall be the judge. In all other circumstances, patients are removed to an isolation hospital unless approved arrangements are made for their isolation by friends or relatives. Plague patients must be removed to hospital.

Necessary disinfection and suchlike measures are left to the discretion of the port health officer.

If the disease be smallpox, free vaccination is offered to all on board. Free plague inoculation is likewise offered to all on a plague-infected ship.

A plague-infected vessel has to be freed from rats either before or after discharge of cargo, and other measures, such as surveillance or observation of passengers and crew, disinfecting of men, and parts of the ships suspected of being infected, etc., may be applied. A very anomalous feature of the rules which will doubtless be changed in revision is that a plague epizootic on a ship does not constitute that ship "infected" or "suspected" provided no human cases have occurred, though in such a "healthy" ship the rats have to be destroyed. As in nearly all other port health regulations in the East, so in the old Indian Regulations, not nearly enough insistence is laid on the fact that bubonic plague is, first and last, a rat disease and that the human case is relatively of very small importance or of no importance at all. It is to be hoped that this will be made quite clear in the revised regulations, as rules and regulations have an educative value quite apart from the immediate purpose for which they are framed.

In the case of any vessel leaving any port of British India that has been declared to be infected with any contagious or infectious disease, all passengers and crew are medically examined before departure; all merchandise which the health officer considers to be infected with plague must be disinfected on shore previous to embarkation; all clothing, bedding, etc., of deck passengers are disinfected (in the case of plague); and a bill of health is given to the master of the vessel showing what has been done. If the health officer consider that a person is suffering from infectious or contagious disease he can prevent such person from embarking.

XXI — BURMA

Burma, with its long coast-line, lies along the eastern shore of the Bay of Bengal and occupies the western portion of the Indo-China Peninsula. Its land frontiers separate it from Siam, Laos (French Indo-China), Yunan (China), Assam and Eastern Bengal. It covers an area of 233,707 square miles and supports a population of 13,212,192 (census 1921).

It is primarily an agricultural country and its exports of rice each year to many parts of the world are very large. Timber and oil likewise contribute largely to its prosperity. The rapid development of the country has been facilitated by a magnificent system of waterways and most of the traffic in merchandise, both import and export, is waterborne. Railways are beginning, however, to play an ever-increasing part in opening up the country.

For purposes of administration Burma is divided into thirty-one districts, twenty of which are in Lower Burma (combined population 7,007,347) and eleven in Upper Burma (population 3,763,843).

Registration of Vital Statistics.

Until quite recently the registration of vital statistics was not possible in many of the more inaccessible, sparsely-populated regions of Burma and the most recent public health report relates to an area of only 110,346 square miles with a population of 10,771,190. In certain of these primitive backward districts registration has recently been commenced; the illiterate headmen of villages who are responsible for this registration employ coloured sticks, pieces of bamboo, or coloured beads for the purpose of notifying births and deaths that occur in their communities. Data collected in this manner are unlikely to have any great statistical value for some years to come, but it is satisfactory to learn that a beginning has been made in this important matter.

In the districts of Burma in which registration has long been in force, the figures indicating the total number of deaths approach accuracy in towns; in villages omissions are considerable, and in the rural tracts of certain districts it is probable that little more than two-thirds of the deaths are recorded. Village registers are inspected from time to time by district civil surgeons and by members of the vaccination staffs, and the entries are verified. Fines are inflicted for failure to register births or deaths. In certain of the larger towns the registrars have a medical training; in such places the certified causes of deaths deserve more consideration than they merit in most parts of the country.

Figures indicating the number of deaths attributed to plague, cholera and smallpox are approximately accurate; mild cases of all three diseases are likely to escape observation and record here, as in most other countries in the East.

In those parts of Burma in which registration of births and deaths has long been in force it is unlikely that any epidemic causing considerably increased mortality could exist without early detection.

Birth-rates.

For 1922, the 20 districts of Lower Burma, with a population of 7,007,347, had a birth-rate of 27.27 per mille, and the eleven districts of Upper Burma, with a population of 3,763,843, a birth-rate of 34.18. For Burma as a whole the birth-rate was 29.69. The urban rate was only 25.89. The birth registration in towns appears to be much more defective than death registration (by-laws regarding cemeteries and cremation-grounds make it difficult or impossible to dispose of a corpse without an official permit).

Death-rates.

The death-rate for Lower Burma in 1922 was 22.41 per mille, for Upper Burma 21.90 and for the combined province 22.23 as compared with 28.6, the mean rate of the previous five years. The urban death-rates were 33.07 in Lower Burma and 40.57 in Upper Burma. It is difficult to estimate how far the greater mortality in towns, as compared with the mortality in rural areas, is due to more efficient registration in the former.

The infant mortality rate in Burma in 1922 was 174.49 per 1,000 births in rural areas, and 284.72 in towns. It is possible that the urban rate is an over-statement. As has been stated already, death registration is undoubtedly more efficiently carried out in towns than is birth registration.

The chief causes of death in the towns of Burma, according to the returns of 1922, are tabulated below. There are 64 towns in Burma with an aggregate population of 1,211,536. Excluding Rangoon (341,962), Mandalay (148,917) and Moulmein (61,301), no other town has a population as large as 50,000.

Causes of Death in the 64 Towns of Burma during 1922, Death-rates per thousand of Population.

Cholera	1.52
Smallpox	0.38
Plague	4.63
Malaria	2.18
Enteric fever	0.18
Measles	0.06
Other fevers	2.40
Beri-beri	0.21
Dysentery	1.19
Diarrhœa	1.21
Pneumonia	2,44
Phthisis	1.40
Other respiratory diseases	3.24
Injuries and all other causes	0.69
	16.29
	38.02 (42.67 mean rate of previous five years).

Cholera.

Below is given in tabular form the number of deaths that have been attributed to cholera in each month of the last five years; the annual totals for the preceding eight years are also given.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1918	11	12	108	249	249	127	290	158	438	836	857	934	4,269
1919	1,043	971	1,036	1,280	1,456	1,290	1,889	1,309	748	853	669	716	13,260
1920	298	142	555	453	284	364	398	333	190	216	126	137	3,396
1921	284	245	265	498	675	397	391	299	226	174	190	147	3,791
1922	192	287	754	967	547	350	280	204	247	206	625	388	5,047

Year	Total Cholera Deaths	Year	Total Cholera Deaths
1910	2,011	1914	2,073
1911	4,191	1915	17,597
1912	7,186	1916	1,673
1913	4,339	1917	1,914

The above figures indicate that cholera is endemic in Burma. Here, as in most other Oriental countries, 1919 was characterised by a very severe outbreak. The incidence of the disease is always higher in Lower Burma than in Upper Burma; the Delta region of Lower Burma usually suffers most and it is from this area that epidemics appear to spread.

The table also shows that the seasonal prevalence of cholera is less characteristic in Burma than in certain other cholera-infected countries of the East; the disease is, however, somewhat more prevalent in the first half than in the second half of the year. Contamination of water supplies is responsible for the majority of cholera cases that occur.

During the first five months of 1923 cholera was responsible for 831 deaths.

Very little use has been made in Burma of cholera vaccination as a means of fighting the disease. The experience of French Indo-China and of the Dutch East Indies in conditions not dissimilar to those in parts of cholera-infected Burma suggests that much might be accomplished by the systematic use of cholera vaccine on an extended scale.

Plague.

The following table gives the number of deaths for which plague has been responsible during each month of the last five years :

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1918	1,798	*1,815*	1,391	780	525	693	560	353	286	198	137	304	8,840
1919	797	*892*	804	304	198	149	365	189	145	90	123	341	4,397
1920	989	*1,540*	1,095	310	131	146	304	313	123	100	141	291	5,483
1921	547	*747*	712	315	117	237	399	251	233	134	195	499	4,403
1922	1,327	*1,520*	1,025	460	231	358	347	396	264	256	807	841	7,282

Plague infection was introduced into Burma (Rangoon) in the early months of 1905, eight and a-half years after Bombay became infected. Since the spring of 1905 no month has passed without cases and deaths from plague being reported from Rangoon city. In spite of this persistence of infection, conditions in Burma, climatic or other, or both, are not very favourable to plague, and no year has witnessed an epidemic in any way comparable in severity to the severe outbreaks that have been experienced in the worst affected provinces of British India. From the beginning of 1905 up to date, some 110,000 deaths have been attributed to bubonic plague in Burma.

During the first five months of 1923 plague deaths in Burma numbered 5,336, of which 676 were reported from Rangoon.

More than 70 per cent of the total plague deaths recorded in Burma have been reported from towns, Rangoon city alone being responsible for about 20 per cent of the total mortality. In

other words, plague is an urban disease in Burma, with less tendency to diffusion than in the north and west of India, and the towns chiefly affected have been those on main lines of communication, river or rail. In 1922 the plague death-rate in towns was 4.82, whereas for rural areas it was only 0.18 per mille. Lower Burma has suffered considerably more than has Upper Burma.

The seasonal prevalence of the disease in Lower Burma is unlike that of any other province of British India. The plague season extends from November to April, with a secondary rise in the plague mortality curve which reaches its height commonly in the month of July. This secondary rise in the epidemic curve does not occur in Upper Burma.

Smallpox.

Smallpox is not a very serious cause of morbidity and mortality in Burma, though the disease is always present. Below are produced figures indicating the deaths attributed to smallpox in Burma each month during the past five years :

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1918.	64	112	106	106	131	57	69	32	19	5	7	42	750
1919.	168	419	735	783	650	426	269	138	79	98	63	100	3,917
1920.	135	380	576	522	398	400	155	94	64	30	28	71	2,853
1921.	81	98	157	206	144	107	79	33	44	15	3	20	987
1922.	51	99	179	183	186	203	148	136	113	24	53	64	1,439

The months March to June are the months of maximum smallpox mortality in Burma; the disease is much less in evidence in the second half than in the first half of the year.

In 1922 about a quarter of the deaths occurred among children less than ten years of age. Sixty-eight per cent of the deaths were reported from rural areas.

During the first five months of 1923 smallpox deaths numbered 1,564.

On the whole, primary vaccination is efficiently carried out in Burma.

The Port of Rangoon.

From the point of view of foreign trade Rangoon is by far the most important port of Burma; it is the only Burma port that was visited during the course of the present tour.

Rangoon is a river-port, being situated on the left bank of the Rangoon River, one of the outlets of the Irrawady, some 21 miles from the sea. Vessels drawing up to 30 feet of water can make the port at high tide.

The administration of the port is in the hands of a Port Commission. The harbour provides anchorage for vessels of all kinds and possesses 14 swinging and eight fixed double moorings.

Along the left river bank wharves provide facilities for loading and unloading sea-going vessels and there are numerous pontoons for inland vessels and river craft. Large developments in the port are under consideration. New docks are to be built which will bring vessels into close communication with the railway system of Burma. Sea-going vessels will be able to enter these docks at all states of the tide.

During the year 1921-22 the goods that passed over the Commissioners' wharves, pontoons, jetties, foreshore and railway-sidings amounted to 2,511,095 tons. Of this total 1,338,593 tons were sea-borne traffic; 763,852 tons were river-borne and 408,670 tons were rail-borne.

Steamers arriving in the port during 1921-22 numbered 1,338, having a gross tonnage of 5,278,599 (3,070,677 net). In addition there were 370 sailing-vessels, aggregating 30,680 gross, 27,832 nett tons.

The principal imports totalled 931,766 tons, in addition to 106,000,000 yards of piecegoods and 28,000,000 gallons of oils and liquors.

The principal exports amounted to 2,292,674 tons, and 118,000,000 gallons of oil. Of these exports 1,728,970 tons were rice; 148,072 tons timber; 146,876 tons rice bran; and 109,441 tons of pulse. Thus Rangoon owes its prosperity as a port to rice, oil and timber—chiefly rice.

The number of inward passengers in 1921 was 306,432 from ports outside Burma and in 1922, 320,606. A large proportion of these passengers consist of Indian coolies coming from Indian ports to work, chiefly in connection with the rice harvest. Arrivals at the port are always in considerable excess of the departures.

The Port Health Officer acts also as the Administrative Medical Officer to the Port Commissioners. In addition to the ordinary routine work of a port health officer, he is in charge of a dispensary for the treatment of the Commissioners' employees, and is responsible for the sanitation and conservancy of the whole port area.

The water supply for ships is a deep-well water, plentiful and of good quality : the frequent examinations that are made are said to yield invariably satisfactory results. The water-boats are well looked after.

The port of Rangoon is not at present provided with a quarantine station. Proposals for the establishment of such a station have been under consideration for some time. There are, however, well-designed recently constructed buildings in which incoming coolies are medically examined, cleansed, vaccinated if necessary, and their clothing and effects disinfected. These buildings are kept in excellent order and the only adverse criticism that could with fairness be made

relates to the inadequacy of bathing accommodation. The steam disinfecting plant is adequate and in good working order. A hospital and dispensary are shortly to be added.

Patients suffering from infectious diseases, arriving by boat, are transferred to the town infectious diseases hospital situated at some distance from the port area. There are also buildings in the town of a temporary character in which suspected cases or contacts could be kept under observation, but the accommodation is insufficient and unsuitable for all the crew and passengers of an infected vessel of any size.

During 1922 the Port Health Officer and his staff inspected 1,412 vessels and 320,477 passengers. Masters of vessels reported 49 cases of infectious disease and 56 other cases were detected by the Port Health staff.

The Port Health Authority is provided with a Clayton gas apparatus for the fumigation of ships; this is installed in a launch and is in excellent working order.

The Town of Rangoon.

It was as recently as 1852 that Rangoon passed under British occupation; it was then a small town of thatched huts situated in a swamp. To-day it is a thriving commercial town and port, with a population of 341,962 (census 1921).

A swamp in low-lying deltaic country is not an ideal site for building a city, more especially in a tropical climate. Considering these inherent disadvantages and the fact that "town-planning" is a very modern art, one cannot but express surprise that Rangoon as a city is as satisfactory as it is. The site is not all swamp : a ridge of laterite does much to relieve it of the monotony it would otherwise have possessed, but the business and port areas of the town have been nearly all marsh and swamp at no remote date. The residential quarters are on slightly-raised ground and luxuriant vegetation makes these parts of the town and neighbourhood very picturesque.

The central densely populated portion of the town is on the whole well constructed and reasonably well designed. A portion of it is sewered, has good surface drains and a good water supply. Towards the periphery of the town, however, many of the houses are still of very primitive design and, situated as some are in swamps, are altogether deplorable from a health point of view. The Development Trust, by reclaiming land and rebuilding, is doing much to improve conditions in some of the worst quarters, but very much still remains to be done.

Rangoon is situated in 16° 46′ north latitude and 96° 18′ east longitude. Its climate is moist and hot. The annual rainfall approximates 100 inches, most of which falls between May and September. The mean monthly temperature ranges between 77° and 88° F. and the mean monthly relative humidity between 75 and 92 per cent.

Hospitals.

There is a large Government General Hospital in Rangoon and a medical school. This hospital is one of the best designed and equipped hospitals in the East. The infectious diseases hospital is housed in more or less temporary buildings and is not very satisfactory. A larger permanent hospital for all infectious diseases is to be built in the near future.

In the Rangoon Pasteur Institute some valuable routine and research work is being carried on : the wealth of clinical material available for research in Rangoon is remarkable.

The Municipality.

The administration of Rangoon is in the hands of a Municipal Council, consisting of 25 members, with an official chairman nominated by the Government of Burma. Of the 25 members six are nominated by Government, eighteen are elected, and one is an ex-officio member. The income of the Municipality in 1921-22 was 59 1/2 lakhs of rupees and expenditure amounted to 63 1/2 lakhs. (A lakh is equivalent to about £6,666 sterling.)

The water supply of Rangoon is derived principally from Hlawga Lake, but supplemented from Kokine Lake and certain tube wells when and where necessary. The fact that much attention is being given to fresh sources of water supply is sufficient indication that existing sources are inadequate to meet all demands.

The Municipal Health Department is in the charge of a Medical Officer of Health, with two assistant medical officers.

On the whole, the conservancy appears to be well cared for, though the surface drains are unsatisfactory in places. Rubbish is dumped and used for the reclamation of swampy land; the process as carried out is almost free from nuisance. Night soil is removed from the extensive non-sewered areas of Rangoon in wooden carts and deposited either into the sewers or else directly into the river. Markets and slaughter-houses receive careful attention.

Vital Statistics.

The registration of deaths is efficiently carried out in Rangoon. The registrars have a medical training. It is extremely unlikely that a death could escape notification; by-laws concerning burial-grounds and cremation grounds are carefully enforced. Birth registration is less accurate.

Deaths and Death-rates.

The total deaths from all causes recorded in 1921 numbered 12,066 : in 1922, 12,323. These figures are equivalent to death-rates of 35.28 and 36.04 per mille respectively. The mean death-rate for the five-year period 1917-21 was 42.93. The more important causes of death were as follows :

	1921	1922
Cholera	101	264
Smallpox	18	72
Plague	1,126	1,402
Malaria	387	406
Enteric fever	38	43
Measles	1	6
Other fevers	318	329
Beri-beri	109	123
Dysentery	420	400
Diarrhœa	556	539
Pneumonia	1,328	1,308
Phthisis	856	987
Other Respiratory Diseases	913	897
Cerebro-spinal meningitis	26	

The infant mortality rate of Rangoon is very high, 322.7 per thousand births in 1921 and 327.7 in 1922. Defective birth registration may make these rates an over-statement.

Plague in Rangoon.

Rangoon has been responsible for 20 per cent of the total plague mortality of Burma.

Since infection was first introduced into Rangoon in 1905 the annual mortality attributed to plague has been as follows : *1905* 2,468; *1906* 2,974; *1907* 2,114; *1908* 1,061; *1909* 709; *1910* 847; *1911* 1,522; *1912* 817; *1913* 896; *1914* 1,585; *1915* 571; *1916* 1,810; *1917* 1,288; *1918* 1,608; *1919* 782; *1920* 1,127; *1921* 1,126; *1922* 1,402; *1923* (first six months) 676.

When regard is had to the size of the population of Rangoon these figures are not large; they, however, afford no evidence that the disease is loosening its grip of the town. Not a single month has been plague-free since 1905. This persistence of infection is of interest when it is recalled that Rangoon remained free from infection for more than eight years after Bombay became infected.

In the low-lying coastal districts on either side of the Bay of Bengal, throughout the Indo-China Peninsula to the Malay Peninsula and the low-lying districts of the Dutch East Indies, climatic and other conditions are relatively unfavourable to the epidemic evolution of plague and it is only in places in which rat infestation is excessive that plague infection persists, and even then with some difficulty. The history of plague in Burma is illustrative of this generalisation.

It is important, then, to consider some of the more important causes that are responsible for the excessive rat infestation of Rangoon and the possibility of effecting a permanent reduction of the rat population. The size of Rangoon's export trade, coupled with the fact that the city is the most important persistent focus of endemic plague in Burma, makes the matter one of quite unusual interest and importance. Rangoon's exports of rice approach two million tons a year.

There is direct evidence that the rat infestation of Rangoon is very considerable. The number of rats destroyed each year by the municipality is large. In 1921, 405,178 rats were destroyed and 408,785 in 1922. These figures are very considerable for a town with a human population of only 341,962, though they are evidently not sufficient to diminish effectively the rat population; similar catches are made every year.

The chief characteristic of Rangoon favouring excessive rat infestation appears to be the number and size of the rice-mills and rice-stores. In this connection it is interesting to note that the late Director of Public Health of Burma, after a close study of the behaviour of plague in Rangoon during many years, came to the conclusion that year after year plague first appeared in the outskirts of the town in which these rice-mills and-stores are for the most part situated, and subsequently spread inwards to the better-built central parts of the city.

An inspection was made of one of the largest and one of the best of the Rangoon rice-mills and it would be hard to imagine any conditions more favourable to rats—anything more harmful from the health point of view in a plague-infected town. There was evidence of an excessive rat population and the amount of damage done by rats, quite apart from plague, must be enormous. In the very large store-houses of that mill innumerable bags of milled rice are stored, sometimes for long periods of time. It was evident that no serious attempt had ever been made to eliminate the rat, though much might be done to improve matters at no prohibitive cost. The possibility of eliminating the rat from grain-stores has been referred to in the special plague chapter of this report. The question is not only of very great importance to Rangoon, it is also of prime importance to other rice-exporting countries and still more to the numerous countries which import the rice. The following simple statement of facts is sufficient to indicate the possibilities.

Plague infection is always present among the rats of Rangoon and the rice-mills are more heavily rat-infested than any other parts of the town. Most of the rice-mills and wholesale

stores are on the banks of creeks connected with the Rangoon River. Bags of rice are taken from the rat-infested rice-stores and placed into rat-infested lighters or barges. An empty lighter, selected because it was the nearest at hand, was fumigated with sulphur dioxide by means of a Clayton apparatus at the writer's request; 18 rats were found dead after a short fumigation. From these lighters the rice is hoisted into ships in the usual manner : that rats are hoisted too is a matter of certainty. The danger is not an imaginary one : more than once during the tour through the Far East attention was directed to the fact that plague had first appeared in grain-stores containing rice imported from Rangoon, or other large rice-exporting ports.

It is not contended that the conditions under which the grain trade is carried on are worse in Rangoon than in most other ports. Invidious comparisons are neither made nor intended. Everywhere these matters call for more attention than they have hitherto received.

Pending the improvement of the rice-stores of Rangoon, a great deal might and should be done to lessen the danger. Frequent periodic fumigation of the lighters and barges and of the ships engaged in the rice trade is essential. The possibilities of fumigating the bags of rice either in lighters or in the ship itself, or in a specially-constructed godown in which hydrocyanic acid gas might be used, should most certainly be considered.

The elimination of the rat from the rice-mill and rice-store of Rangoon is, of course, the end at which to aim. If that were accomplished the plague problem of Rangoon might find a ready solution, a consummation that would be to the infinite advantage of Rangoon trade and commerce. If total elimination be impossible, a reduction in numbers sufficient to reduce almost to vanishing point the present danger of exporting plague infection with rice is certainly possible, and when the importance of the matter is realised it will most certainly be done.

The seasonal prevalence of plague in Rangoon is unusual. In the following table is set out the monthly incidence of deaths that have been attributed to plague during each month of the past five years :

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1918.	102	284	*422*	219	129	**157**	145	83	75	52	4	16	1,688
1919.	46	67	*161*	146	32	37	**99**	71	64	21	12	25	782
1920.	76	202	*259*	131	58	52	110	**132**	61	18	11	22	1,127
1921.	51	88	*158*	107	46	97	**214**	126	122	41	24	52	1,126
1922.	131	169	*217*	193	96	111	130	**174**	77	45	27	82	1,402

The above table illustrates well the secondary rise in the epidemic curve that was referred to when plague in Burma as a whole was under discussion. Epidemics almost invariably reach their height in the month of March, but each year there is evidence of a second epidemic wave attaining its maximum intensity in June, July or August. No altogether satisfactory explanation of this unusual plague curve is forthcoming; it has characterised plague in Rangoon since infection was first introduced in 1905.

The case mortality rate of plague in Rangoon corresponds with that of other towns in British India. Of the 230 cases that were treated in the municipal infectious diseases hospital in 1921, 162 died, a case mortality rate of 70.43%.

Of plague preventive measures carried out by the municipality, rat destruction is the most important. The number of rats destroyed during the last two years has been referred to above. A certain number of these rats are examined at the plague laboratory. Of the 17,936 examined in 1921, 108 were reported to be plague-infected.

Five species of rats are found in the houses of Rangoon, viz., *Rattus concolor ; Rattus rattus ; Rattus norvegicus* (*decumanus*); *Gunomys bengalensis* and *Gunomys varius*. From the plague point of view *Rattus concolor, Rattus rattus* and *Rattus norvegicus* appear to be of chief importance. *Rattus concolor* is a miniature *Rattus rattus*, resembling the larger species in every respect except that of size. It appears to occur throughout the Indo-China Peninsula and is quite common in the hill tracts of Java, where, however, it is not so domesticated in its habits as it is in Rangoon.

Cholera.

The deaths for which cholera has been responsible in Rangoon during each month of the past five years are as follows :

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1918.	—	—	9	11	6	4	2	1	1	3	7	30	74
1919.	14	11	21	28	34	43	51	16	5	1	0	9	233
1920.	3	1	7	6	7	8	16	—	1	2	1	9	61
1921.	16	11	8	13	11	4	6	4	5	1	6	16	101
1922.	14	21	38	27	47	45	41	9	4	1	8	8	264

It will be noted that cholera infection is rarely absent from Rangoon. A study of the time and place distribution of cases gives rise to no suspicion of water-borne epidemics. Twelve of the fifteen registration circles into which Rangoon is divided contributed to the 101 cholera deaths reported in 1921. Forty-one of these deaths occurred in hospitals and four were port cases.

During the first five months of 1923, twenty-six deaths from cholera were reported from the city.

Smallpox.

The monthly incidence of deaths attributed to smallpox in Rangoon during the past five years is as follows :

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1918.	2	8	19	21	17	4	6	3	2	1	1	11	95
1919.	59	130	208	122	56	25	10	12	6	15	5	8	656
1920.	14	20	22	29	15	7	4	5	4	0	0	0	120
1921.	0	1	7	8	2	0	0	0	0	0	0	0	18
1922.	0	2	5	7	8	10	9	7	15	3	3	3	72

In only one year of the five was smallpox present in more or less severe epidemic form. As in other parts of British India, the disease is most in evidence in the first half of the year.

During the first five months of 1923 smallpox deaths in Rangoon numbered 294.

It is stated that Rangoon is almost exclusively the port of entry of smallpox infection into Burma and spreads from Rangoon into the districts; and that an epidemic usually lasts two years in Rangoon and three years in the districts.

Primary vaccination of children is compulsory in the towns of Burma and the law is well enforced in Rangoon. During the year 1921-22 the births registered numbered 6,145; deaths during the first year of life numbered 1,946; and the number of infants vaccinated was 5,186. The calf lymph used is made locally in a municipal depot.

XXII — BENGAL

The Presidency of Bengal comprises roughly a wedge-shaped territory, the base of which forms the northern shore of the Bay of Bengal, the apex being in the sub-mountain districts of the Himalayas. It lies between 87° and 92° east longitude and 21° and 27° north latitude. Its area is 76,843 square miles, and it supports a population of 46,522,293 (census 1921).

For the greater part, Bengal is a densely-populated, flat, fertile, alluvial plain intersected by very numerous waterways, which comprise the deltas of the Ganges and the Brahmaputra. This plain is separated from the Bay of Bengal by a fringe of swamp and forest known as the Sunderbans.

The Hooghly is the largest of the mouths through which the waters of the Ganges find their way into the Bay of Bengal; on the left bank of this river some 80 miles from the sea is situated the town and port of Calcutta, the chief city of Bengal and formerly the capital of British India.

Before attempting a description of Calcutta, it would be well to say something of the prevalence of the more important epidemic diseases during recent years in Bengal as a whole. Of these diseases cholera is by far the most important from the point of view of the present enquiry.

In Bengal, as in other presidencies and provinces of British India, the registration of births and deaths is compulsory. The accuracy with which such vital statistics are recorded varies in the different provinces. In the rural areas of Bengal births and deaths are registered with some approach to accuracy, but in the towns municipal authorities pay much less attention than they should to the provisions of the Registration of Births and Deaths Act. Attention to this neglect is directed year after year by the Director of Public Health of Bengal in his annual reports.

The recorded birth-rate for Bengal in 1921 was 28.0 per thousand and 27.4 in 1922. The mean birth-rate for the quinquennium 1917-21 was 30.2 per thousand.

The death-rate for all causes of mortality was 30.1 per thousand in 1921 and 25.2 in 1922, as compared with 32.0 per thousand, the mean rate for the five-year period 1917-21.

Cholera.

The registered monthly incidence of cholera mortality in Bengal during the past five years is set out in the following table :

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Death Rate per 1,000	Percent. of Total Mortality
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1918.	7,561	4,032	7,998	16,185	8,072	3,220	3,581	1,938	2,392	3,556	8,328	15,606	82,379	1.8	4.1
1919.	10,376	11,069	22.438	28.485	17,136	6,977	4,365	2,868	2,752	2,710	5,933	9,840	124,949	2.8	7.7
1920.	6,265	4,486	4,901	6,035	3,590	2,464	2,581	1,939	1,190	1,728	7,086	11,934	54,199	1.2	3.9
1921.	10,335	6,622	7,839	9,811	4,767	2,180	1,681	1,606	1,556	8,661	16,383	9,106	80,547	1.7	5.7
1922.	5,877	3,055	5,874	10,131	9,778	4,410	2,393	1,352	1,051	1,547	2,020	4,224	51,712	1.1	4.4

It will be noted that no month of the year is free from cholera infection in Bengal, and in no month during the past five years has the number of deaths ascribed to cholera fallen as low as one thousand.

Formidable as are the figures representing the total annual cholera mortality in the above table, the prevalence of the disease appears definitely to be on the decline. Thus the number of deaths attributed to cholera during the five years 1916-20 was 377,364, which represents an average annual mortality of 75,473. During the previous five-year period 1911-15 the cholera deaths amounted to 462,018, or an average annual incidence of 92,403 deaths. These figures signify an 18 per cent reduction in the annual cholera mortality. The claim is put forward that the decreasing prevalence of cholera in Bengal during recent years is due to increased activity in the sphere of public health. It is true that considerably more attention is now being paid to sanitation and to the prevention of epidemic disease in rural areas of Bengal than was the case a decade ago. The deaths still attributed each year to cholera indicate, however, how much remains to be done in these directions in Bengal villages and towns.

In the main, cholera in Bengal is a water-borne disease. In the majority of outbreaks that are investigated polluted tanks, polluted wells or polluted streams are incriminated.

Space does not permit of a detailed discussion of the numerous facts of epidemiological interest that emerge from a study of cholera in Bengal, but attention might profitably be directed to a few.

Of the outbreaks the mortality of which is given in the table reproduced above, that of 1919 was by far the most severe. The cholera mortality for 1919 amounted to no less than 124,949, a figure which represents 7.7 per cent of the total mortality from all causes for that year, and a death-rate of 2.8 per thousand of the population of Bengal. The outbreak of 1919 was also unusually widespread even for Bengal. Of the 498 circles of registration into which Bengal is divided cholera deaths were reported from no fewer than 494; of the 119,350 villages in Bengal

cholera was reported from 15,876, and not one of the 116 towns was altogether free from the disease. In only one of the previous ten years was a higher cholera mortality rate recorded than in 1919.

Though cholera epidemics are of almost annual occurrence in all of the 27 districts of Bengal, certain districts suffer much more than others, the distribution of the disease being by no means uniform. Thus during the decade 1911-20 the three districts that suffered most were 24-Parganas, Howrah and Noakhali; in these districts cholera was responsible for 12.7, 10.4 and 9.4 per cent respectively of the total mortality from all causes—average cholera death-rates of 3.6 ,2.9 and 2.5 per mille per annum. In the districts of Darjeeling and Dinajpur, which suffered less than any other, cholera deaths were only 2.2 and 1.6 per cent of the mortality from all causes—average cholera death-rates of 0.9 and 0.6 per mille per annum respectively.

Of the many factors which determine the varying severity of cholera outbreaks from year to year none appear to be more important than deficient rainfall, which is responsible for deficient crops. This in turn leads to abnormal migration with attendant facilities for the diffusion of cholera infection. Movements of labour forces likewise play a part of importance in the spread of the disease, and the collection of large numbers of pilgrims at religious fairs and festivals has, in the past, as in other provinces of India, been instrumental in the widespread and rapid diffusion of cholera infection.

The figures in the table reproduced above show that the cholera mortality curve reaches its height normally about the month of April. With the onset of the rains in June or July the disease becomes less prevalent; only some 12 per cent of the total cholera deaths are recorded in the three months July-September. A second notable rise in the epidemic curve reaches its height in November or December. Such are the chief facts regarding the seasonal prevalence of cholera in the plains of Bengal. In the hill districts the disease is most in evidence in the rains, the epidemic curve reaching its height in June or July. In most other parts of India cholera is likewise most in evidence in the early monsoon months.

Cholera Preventive Measures.

It is realised that the little that has been said concerning the prevalence of cholera in Bengal is altogether insufficient to enable the reader to form an adequate mental picture of the cholera problem of that country, but if the significance of the few facts and figures that have been reproduced be grasped, it will be realised that the problem of cholera eradication or prevention in Bengal presents difficulties unsurpassed by those of any other cognate problem that the world presents to-day. Any marked improvement in existing conditions must await the awakening of a sanitary conscience among the vast illiterate, conventional, prejudice-ridden population of rural Bengal, and this, in its turn, must be preceded by a realisation on the part of municipal councils and district boards of the serious nature of the problem and of the fact that cholera is a readily-preventable disease. The increasing interest that has been taken in these matters during recent years is of good omen.

Speaking generally, the provision of a protected water supply in India means freedom from epidemics of cholera, provided other dangerous water supplies are abolished. In the conditions prevailing in rural Bengal, this is a council of perfection quite impossible of realisation.

The improvement in the cholera situation that has been witnessed during recent years, and to which attention has been directed above, is probably not unconnected with the fact that the difficult question of rural sanitation has at last begun to receive some of the attention that it deserves. In Bengal a real start has been made. A district board has been constituted in each district and many of these boards now employ a district health officer, with a subordinate health staff. Through their agency, earlier information regarding the first appearance of cholera in rural areas is obtainable, and the disinfection of contaminated water supplies can be practised earlier and more methodically than was formerly possible. As these rural health staffs increase and expand to a size commensurate with the importance and the amount of the work to be accomplished, it may be possible to commence co-ordinated operations on a large scale to control and limit the spread of the disease.

Cholera vaccination is coming into use, but hitherto no attempt at mass inoculation has been made. The encouraging results that are claimed for mass cholera vaccination in the Dutch East Indies, in French Indo-China, and in the Philippine Islands, coupled with the fact that this form of inoculation, having no appreciable reaction, has been willingly received by the Oriental populations of these countries, are sufficient to justify a serious consideration of the possibilities of undertaking a cholera vaccination campaign on an extensive scale in Bengal.

Plague.

Plague has been very little in evidence in Bengal in recent years, and what little there has been has been confined to Calcutta and its neighbourhood.

The following table gives the monthly incidence of human plague mortality during each of the past six years :

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1917	0	0	16	24	26	8	4	0	3	0	0	0	81
1918	21	37	28	55	73	54	18	1	0	1	0	1	289
1919	15	52	119	127	85	13	9	0	0	0	0	4	424
1920	1	7	14	31	6	5	2	0	0	0	0	0	66
1921	0	4	17	22	11	2	0	2	0	0	0	1	59
1922	0	4	17	52	53	9	9	5	1	0	0	0	150

Further remarks about plague will be offered when the city of Calcutta is under consideration.

Smallpox.

Smallpox is an ever-present cause of morbidity and mortality in Bengal, but compared with cholera it is relatively unimportant.

Below is tabulated the monthly incidence of smallpox mortality during each of the past five years :

DEATHS ATTRIBUTED TO SMALLPOX IN BENGAL.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1918.	425	609	837	1,697	1,789	1,121	843	245	184	134	150	542	8,576
1919.	868	1,382	3,234	6,170	7,226	6,518	3,788	1,945	1,391	791	1,017	2,680	37,010
1920.	4,471	5,881	7,797	5,376	4,840	3,358	1,724	994	495	332	327	595	36,190
1921.	874	1,220	1,790	1,378	1,082	551	301	206	143	130	230	252	8,157
1922.	520	625	962	1,293	1,447	1,069	808	357	188	172	154	269	7,864

No less than three-quarters of the cases and deaths from smallpox in Bengal are reported in the first six months of the year. The remarkable constancy with which smallpox attains epidemic proportions in the first half of the year in most varied climatic and other conditions is an extremely interesting phenomenon. Of the outbreaks referred to in the above table those of 1919 and 1920 were the most severe, being responsible for 37,000 and 36,000 deaths respectively. High as these figures are, they are equivalent to death-rates of only 0.81 and 0.79 per thousand. In 1921 the smallpox death-rate was only 0.18 per thousand, and in only six districts out of the 27 into which Bengal is divided did the smallpox death-rate exceed one per thousand. The Director of Public Health of Bengal, in his last annual report, points out that smallpox tends to recur in more or less severe epidemic form every five or six years. The rapidity of modern communications naturally facilitates the spread of infection, but there is no evidence that the incidence of smallpox in Bengal is on the increase. The total smallpox mortality for the ten years 1911 to 1920 is only 2% higher than the smallpox mortality of the previous decade, in spite of the fact that the population of Bengal has increased by 2.6%.

Nearly 10% of the total smallpox mortality in Bengal is reported from Calcutta and Howrah.

The City of Calcutta.

Calcutta, the capital of the Bengal Presidency, is situated some 80 miles from the sea on the left bank of the Hooghly River, 22° 34′ north and 88° 24′ east. The Calcutta municipal area extends for some six miles along the river bank and is bounded on the other sides by the Salt Lakes and the Circular Canal. The population, according to the census of 1921, is 907,851, but this figure gives an inadequate idea of the population of the urban area in which Calcutta lies, for Calcutta is in reality but a part of a much more extensive town, being continuous with the urban areas presided over by the municipalities of Cossipur Chitpur, Maniktala, South Suburban, Tallyganj and Garden Reach. If the populations of these towns be added to that of Calcutta, one obtains a figure of 1,132,246.

Opposite to Calcutta on the right bank of the Hooghly lies the town of Howrah, with a population of 195,301. This figure added to the above total gives a population for the urban area in which Calcutta lies of no less than 1,327,547.

Calcutta dates from the closing years of the 17th century, when merchants of the East India Company, under Charnock's leadership, laid the foundation of a prosperous and thriving town. The town grew without any well-thought-out plan and certainly with no consideration of public health requirements. It gradually absorbed surrounding villages on the low-lying swampy river banks; no part of the town is more than a few feet above high-water level. Very much has been done to modernise Calcutta and bring some of it more or less into line with modern sanitary requirements. There are some very fine open spaces, notably the extensive Maidan, fringed with almost palatial modern buildings, but in the narrow streets of the congested areas of the town, conditions, from the health point of view, are most unsatisfactory. Recent years have witnessed considerable improvements effected by the Calcutta Improvement Trust. New wide roads have been made and some of the most crowded areas of the town have been opened up. Very much more remains to be done. The task of sanitating a town that has grown without plan or design is everywhere a task of enormous difficulty and huge expense, especially when, as in the case of Calcutta, room for expansion is altogether incommensurate with the rate of growth of the population.

The prosperity of Calcutta as a commercial town and as a port is due to the fact that it is the natural outlet for the products of the fertile valleys of the Ganges and Brahmaputra. Howrah is the terminus of three great railway systems. Railway lines from the north have their termini in Calcutta itself. The port of Calcutta extends upwards of ten miles along the Hooghly. The Port Trust, which is responsible for the administration of the port of Calcutta, has jurisdiction as far down as the mouth of the river.

The administration of the city of Calcutta is in the hands of a municipality, consisting of 25 elected members and 25 members nominated by the Government of Bengal, the Bengal Chamber of Commerce, the Calcutta Trades Association, and the Port Commission. The public health of the city is in charge of a Municipal Medical Officer of Health, with an Assistant Medical Officer

in sub-charge of each of the four districts into which Calcutta is divided. These districts are further subdivided into 25 wards. There are 20 sanitary inspectors in the service of the Health Department, 10 food inspectors, lady health visitors and midwives, vaccinators, and an adequate subordinate staff.

As is the case in most large industrial towns in India, the constitution of the population is unusual. Of the 907,851 persons in Calcutta, 617,590 are males and only 290,261 females. This disparity is most marked in the middle ages of life, the number of young children and old people of the two sexes being approximately equal. For the age periods 20 to 30 and 30 to 40, males are nearly three times as numerous as females.

At the census of 1921, Hindus numbered 651,765 and Mahommedans 209,066. Non-Asiatics and Anglo-Indians numbered 25,562.

The registration of deaths is carefully carried out in Calcutta, and the figures indicating the number of deaths from all causes are approximately accurate. It is otherwise with birth registration, however, and the number of unreported births forms an appreciable percentage of the total. As in other Oriental towns, the proportion of people who receive qualified medical assistance in their last illnesses is small. It follows that the cause of death has often to be elicited by enquiry from relatives or friends of the deceased.

Below are given in tabular form the birth-rate and the death-rate of Calcutta for each of the last ten years.

	Birth-rate	Death-rate		Birth-rate	Death-rate
1913	20.5	29.2	1918	20.3	35.0
1914	19.4	28.3	1919	18.5	42.2
1915	18.5	28.5	1920	17.1	39.3
1916	20.9	24.7	1921	19.0	33.4
1917	20.9	23.8	1922	19.1	29.1

The birth-rates recorded in the above table are somewhat low for an Oriental population, even if the unusual sex ratio of the population be taken into consideration. In view of the difficulty of obtaining exact information as to the number of births that escape registration, further discussion of the significance of these figures would not be profitable here.

For several years prior to 1918, the death-rate in Calcutta exhibited a downward tendency. The high rates recorded in 1918 and 1919 were in a large measure due to the influenza pandemic, the effects of which are still apparent in the vital statistics of Calcutta.

Year after year the female death-rate in Calcutta is in marked excess of the male rate. In 1922 the female death-rate was 39.6 per thousand, as compared with 24.1, the male rate. Many causes contribute to this relatively excessive female mortality. In the first place, the number of children and old people, among whom death-rates are always higher than at other age-periods, form a much larger percentage of the total female population than they do of the male. Perhaps the most important cause of the high female death rate is the perpetuation of the purdah system, which is certainly one of the chief causes of the widespread prevalence of tuberculosis among Calcutta women; the evils of the purdah system are accentuated a hundredfold in an overcrowded city such as Calcutta. Early marriage is another factor tending towards a high female mortality rate.

The three diseases of chief importance from the point of view of the present enquiry are plague, cholera and smallpox. These will now be considered in some detail.

Plague.

Calcutta became infected with plague in 1898. It received its infection indirectly from Bombay, which town became infected in September 1896. In the following table is set out the number of deaths that have been attributed to plague each year from 1898 to 1922.

1898	192
1899	2,332
1900	8,354
1901	7,883
1902	7,278
1903	8,222
1904	4,689
1905	7,372
1906	2,606
1907	3,591
1908	1,779
1909	2,117
1910	1,262
1911	1,736
1912	1,831
1913	852
1914	442
1915	191
1916	78
1917	81
1918	210
1919	334
1920	53
1921	37
1922	144
TOTAL	63,666

From first to last, plague has been responsible for 63,666 deaths in Calcutta, a small number, spread over twenty-five years, when compared with the size of the population of the city. The

ost remarkable feature of the above table is the rapid decline in plague mortality that has taken ace during the last ten years. The disease is now an almost insignificant cause of morbidity id death, in striking contrast to the early years of the present century, when epidemics of con-derable intensity prevailed.

Though Calcutta has suffered so little from plague in comparison with other parts of India, less than 91 per cent of the total plague mortality of Bengal has been reported from that city. we exclude the districts adjacent to Calcutta the remainder of the province has been almost mpletely plague-free.

A discussion of the probable causes of Bengal's freedom from plague would occupy too much ace here, interesting as the matter is. Speaking generally, physical conditions, the type of velling and agriculture do not favour excessive rat infestation in rural areas and climatic con-tions inhibit excessive flea infestation of the rat. Experience has shown, however, that the nditions in towns, as exemplified by Calcutta, are sufficiently favourable to rats to permit of e epidemic evolution of the disease. That the other big towns of Bengal have escaped is more an probably explained by insufficiency of facilities for the conveyance of infection. The general ovement of rat-favoured merchandise, such as grain, is towards Calcutta from the province and t in the other direction.

The mildness of Calcutta's epidemics during the past ten years as compared with those of e previous decade is not so easy to explain, and speculation is hardly profitable in the absence sufficient data. It may be that the species of rat has changed. It may be recalled that the rge bandicoot, *Bandicoota indica*, a species of rat singularly susceptible to plague, was common Bombay city before the advent of plague, since when it has almost, if not entirely, disappeared m that city.

Rattus rattus, *Rattus norvegicus*, and *Gunymus varius* are all common in Calcutta.

The few cases of plague that have been reported during recent years have been by no means nfined to one or two quarters of the town, but have been distributed over several wards. This es not necessarily imply that infected areas are equally diffused.

At the present time no serious anti-plague measures are undertaken in Calcutta. In former ars what were apparently half-hearted attempts at rat destruction were carried out. These re given up in 1917 as they were considered futile. In that year some 65,000 rats were destroyed. e cannot but regret that decision. In any Eastern port, the systematic capture and systematic amination of rats to determine the presence or absence of an epizootic is of prime importance, pecially in those quarters of the town in which merchandise for export is stored. In the interest Calcutta itself such a measure is also of great importance. Observations carried out over a w years should be sufficient to determine the areas in which infection persists with greatest nacity and the channels by which infection is most commonly imported. The very facts that e disease appears to have so limited a prevalence and that conditions are now adverse to the idemic evolution of plague, should be an incentive to effort in this direction. The assumption at the eradication of plague from Calcutta and the prevention of re-infection are tasks of supreme fficulty, involving huge expense, is not justified on the data available. In the interests of the mmerce of Calcutta such a consummation is devoutly to be desired, and its practicability or herwise is certainly worth more attentive study than it has received.

The seasonal prevalence of plague in Calcutta is remarkably constant in spite of the mildness recent outbreaks. Below is given in tabular form the monthly incidence of human plague ortality during each of the past six years :

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
17.	—	—	16	24	26	8	4	—	3	—	—	—	81
18.	3	3	16	49	66	52	18	1	0	1	0	1	210
19.	1	29	82	118	80	13	9	—	—	—	—	2	334
20.	1	1	10	29	6	4	2	—	—	—	—	—	53
21.	—	1	2	22	9	2	—	1	—	—	—	—	37
22.	—	4	16	52	49	8	9	5	—	—	—	—	144

Cholera.

No month passes in Calcutta without some cases of and deaths from cholera being reported d it is extremely rare that the annual cholera mortality bill falls short of 1,000. The total number deaths that have been attributed to cholera during each of the last ten years is as follows,

1913.	1,764	1918.	1,526
1914.	1,983	1919.	3,688
1915.	1,612	1920.	2,302
1916.	1,335	1921.	1,997
1917.	866	1922.	1,269

The seasonal prevalence of the disease is indicated in the following table, which gives the mber of deaths attributed to cholera each month during the past five years :

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1918.	26	37	259	294	194	179	76	44	27	54	150	186	1,526
1919.	610	341	441	1,050	545	276	88	31	34	90	117	65	3,688
1920.	78	120	291	290	286	386	268	69	50	110	210	144	2,302
1921.	226	145	444	335	306	295	78	41	34	23	34	36	1,997
1922.	59	79	224	347	349	57	30	19	19	15	24	47	1,269

It will be noted that March to June are usually the months of maximum cholera incidence d that the onset of the rains, which usually takes place in June, is followed by a noteworthy minution in the incidence of the disease.

There are several facts regarding the incidence of cholera in Calcutta of some interest fro an epidemiological point of view. Usually the incidence is highest in those parts of the tow which are situated along the river banks, or in the suburban wards, where large tanks are mo numerous. Bathing in these tanks and river is not without its dangers in Calcutta; it probab accounts for the fact that the Hindu part of the population suffers twice as much from chole as does the Mahommedan. In the suburban areas an extensive outbreak frequently follows th contamination of a tank and in urban areas the contamination of wells. Though flies and du are undoubtedly of importance in spreading infection, cholera in Calcutta is chiefly, if not entirel a water-borne disease.

It would be convenient here to refer to the water supply of the city of Calcutta. The wat is derived from the Hooghly, some miles above municipal limits. The raw water is submitte to slow sand filtration and the resulting product is of good quality. Unfortunately, howeve it is quite insufficient in quantity to meet the needs of the population. To supplement the supp unfiltered raw water is also delivered through pipes to most parts of the city. This raw water intended to be used for domestic purposes other than drinking, but in practice it is freely use by the population for all purposes, more especially in the middle of the day, when the pressu in the filtered-water reservoirs is at its lowest.

Recently the Calcutta Municipality has had under consideration a scheme for an increa in the supply of filtered water sufficient to meet all needs. Unfortunately this scheme has be rejected on the grounds of expense, and the existing practice of supplying unfiltered water to th city is to continue. The objections to this from the public-health viewpoint are so obvious to require no emphasis; the practice is undoubtedly responsible in large measure for the inciden of water-borne infections in the city of Calcutta. The water of the Hooghly is liable to co tamination of many kinds.

Smallpox.

The seasonal prevalence of smallpox in Calcutta is shown in the following table, which indicat the number of deaths attributed to the disease in each month of the past five years :

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1918.	5	15	54	134	157	84	49	21	5	3	4	14	545
1919.	58	92	234	408	385	208	80	58	32	27	66	222	1,870
1920.	757	956	736	313	119	27	11	2	0	1	1	2	2,925
1921.	3	7	11	11	9	6	4	1	2	3	8	24	89
1922.	51	71	119	85	55	22	8	5	8	2	8	16	450

It will be noted that 1919 and 1920 witnessed a relatively severe outbreak, which reach its height in February of the latter year. Such serious outbreaks are experienced at intervals about five years.

Considerable attention is paid to vaccination, but re-vaccinations here as elsewhere are matter of some difficulty. During the severe outbreak of 1919-1920 some 300,000 re-vaccinatio were performed. In 1921 the number of primary vaccinations performed by the municip staff was 14,160; re-vaccinations numbered 12,906.

Among the causes of mortality in 1921 one finds the following :

Tuberculosis	2,208
Respiratory diseases, excluding phthisis	7,211
Malaria	1,214
Typhoid	328
"Other fevers"	2,222
Dysentery and diarrhœa	3,151
Influenza	927

A few words about some of these causes of mortality are called for. Tuberculosis is the mo important : the 2,208 deaths attributed to it are equivalent to a death-rate of 2.4 per thousa of population. The incidence of tuberculosis has very definitely increased since the influen epidemic of 1918. The direct mortality attributed to influenza in 1918 and 1919 was 4,115 a 3,363 respectively. These figures are infinitely less than the number of deaths from influen recorded in Bombay, for example, during those two years, but the outbreak appears to have ma edly increased the morbidity of Calcutta in many ways, and the effects of it are still discerni in the vital statistics of the city.

About 94% of reported cases of tuberculosis are pulmonary in form; bovine tuberculo is very rare in Calcutta, as in most other towns of India. Ignorance, overcrowding, bad housi and poverty are the chief predisposing causes of the high tuberculosis rate, added to which the purdah system, to which reference has been made above. In 1921 the male death-rate fr tuberculosis was 1.8 per thousand, whereas the female rate was as high as 3.7. Early marriage m also be a factor of importance in determining the high female rate; in the age period 15-20 t female tuberculosis death-rate was 6.5 per thousand; in the age period 20-30 it was 6.7.

Year after year approximately one-quarter of the total deaths registered in Calcutta attributed to respiratory diseases.

Typhoid fever is another disease which appears to have increased somewhat in prevale during recent years. It is impossible to say what proportion of the deaths under the head "malaria" or "other fevers" should be accredited to diseases of the typhoid group.

Recent years have seen an increase in the number of deaths ascribed to kala-azar in Calcut in 1920 there were 162 fatal cases so diagnosed; 204 in 1921, and 287 in 1922.

The Port of Calcutta.

The administration of the six most important Indian ports is vested by law in specially constituted bodies—Ports Commissions or Port Trusts. These bodies have large powers, but in many important respects they come under the control of the local government concerned.

The Calcutta Board of Port Commissioners consists of a chairman, a deputy chairman, ten members elected by the Bengal Chamber of Commerce, 10 members nominated by the Government of Bengal, two members elected by the Calcutta Trades Association, one member elected by the Bengal National Chamber of Commerce and a representative of the municipality of Calcutta.

The port stretches some 10 miles along the banks of the river, and vessels drawing up to 30 ft. of water can make the port at high tide. In recent years considerable developments have taken place. New docks have been made and old ones enlarged and improved. Riverside berths and jetties have been enlarged and a new jetty is being built. Much work is still in progress.

The rapid increase in the trade of Calcutta led to serious congestion of the port. Unloading facilities at the jetties and transport facilities generally were inadequate for the volume of trade. Recent developments have been so considerable that traffic is now handled without serious delay. It is true that trade is not yet back to pre-war level, but its volume is very much greater than it was during the war period, and that in spite of existing trade depression. Below are given in tabular form some facts of interest regarding the trade of the port :

Trade of the Port of Calcutta.

	1920-1921	1921-1922
Vessels entering the port	1,462	1,209
Net tonnage	4,017,514	3,446,021
Vessels leaving the port	1,419	1,233
Berthed at the jetties	185	233
Vessels over 21ft. draught :		
Inward	349	338
Outward	860	629
Vessels entering docks	1,133	838
Jetties—imports	684,990 tons	622,411 tons
Docks—imports	413,357 »	697,361 »
General exports	1,133,719 »	974,783 »
Coal	3,046,400 »	1,686,222 »

Port health regulations and procedure have already been described for the ports of India as a whole. These activities in Calcutta are entrusted to a port health officer with three medical assistants. On his staff there is also a port sanitary inspector and an inspectress. In 1920, 377 inward and 1,262 outward vessels were medically inspected, either in the river or in the docks : the figures for 1921 were 699 and 1,231 respectively. The crews and passengers inspected in 1921 amounted to 106,476 and 115,343 in outward vessels, and 82,285 and 107,405 in inward vessels.

When Calcutta is declared "infected" with plague, there is a routine disinfection of clothing and bedding of Asiatic and African members of crew and of third-class deck passengers. The arrangements for this disinfection are satisfactory, but the stations would be improved by the provision of better bathing facilities. There are two such disinfection sheds at the Kidderpur Docks and one at the new passenger-shed at Eden Gardens Ghat.

During 1921, 5,675 cargo-boats were inspected by the port sanitary inspector : 311 cases of sickness were reported on such boats.

Among the 20,488 European seamen arriving at the port in 1921, there were seven cases of cholera, 50 cases of dysentery, 13 of enteric fever, 147 of malaria, 17 of influenza, four of sunstroke and 872 of other diseases. All of these were admitted to Calcutta hospitals, and of the 1,127 cases admitted 14 died. There is always a very large Asiatic floating population in the port of Calcutta : at the census of 1921 it numbered 18,441. During that year there were 126 deaths, 6.83 per thousand. Thirteen of these deaths were attributed to cholera, a smaller number than usual.

Each year a number of cholera cases and deaths is reported from this floating population; the number of deaths so reported during the last six years is as follows :

1916	47	1919	80
1917	28	1920	22
1918	41	1921	13

During 1921 a cholera case or cases occurred on board twelve ships during their stay in the port of Calcutta.

Among the Indians employed on boats and ships from the River Hooghly during 1921 there were 44 cases of cholera admitted to hospital, of whom 11 died.

Municipal filtered water is supplied to ships in the harbour : the water-boats are carefully supervised. During 1921, 61 outgoing steamers were fumigated by means of the port Clayton apparatus. Deck passengers for the Straits Settlements to the number of 3,228 were vaccinated.

As stated in a former chapter, Calcutta is not yet in possession of a quarantine station, though the necessity for this is fully recognised by the local health authorities and by the Government of India. The Indian Yellow-Fever Committee, to which reference has been made, selected a site at Rajabagan, which, all things considered, is the best available.

On the whole, the stores and goods sheds belonging to the Port Commissioners are satisfactory; some of them, however, leave much to be desired from the rat-infestation point of view.

XXIII — BOMBAY PRESIDENCY

The Bombay Presidency is situated along the west coast of the Indian peninsula for the greater part of its length, extending northward till it abuts on the Punjab, Baluchistan, and Rajputana and southward to the southern districts of Madras. It possesses a greater diversity of climatic conditions than the other two large provinces of British India that are considered in this report. Along the coast-line the climate is hot and moist, in comparison with which the uplands of the Deccan are cool. In contrast to both of these areas, Sind, the northern part of the Presidency, suffers from an intense dry heat in summer and comparative extreme cold in winter. This great diversity of climatic conditions is reflected in the absence of the usual well-marked seasona prevalence of certain diseases when these are considered for the Presidency as a whole. Thus; for example, plague in the city of Bombay reaches its height in the month of March or April, in the Deccan, September and October are usually the months of maximum prevalence, while, in the north, epidemics tend to be of the Punjab type, reaching their height towards the end of April.

The population of the Bombay Presidency, according to the census of 1921, was 19,165,614. As in most other parts of India, the population is for the greater part rural. There are 113 towns, with an aggregate population of 3,728,396. Of these the largest are : Bombay (1,148,815); Ahmedabad (270,000); Poona (133,000); Sholapur (119,000); Surat (117,000); and Karachi (100,000). Very few of the remaining towns have a population exceeding 50,000, and many of them have less than 10,000 inhabitants.

Governments hospitals are under the supervision of the Surgeon-General of the Government of Bombay, who is the adviser to the local government in medical matters. Public health matters are under the control of a director of public health, assisted by five deputy-directors for the various registration areas into which the Presidency is divided. The municipalities employ for the greater part their own health officers and public health staffs. In each of the 37 districts into which the Presidency is divided there is a civil surgeon who, in former years, was the public health adviser to the administrative officer in charge of the district. Recently, however, district boards have been created, certain of which employ a district health officer and staff. Until recent years questions of sanitation and disease prevention in rural areas did not receive in any Indian province the attention which their importance merits; the increased attention that has been paid to these matters during the last few years is of good omen.

Along the long coast-line of the Bombay Presidency there are 75 ports, more or less worthy of the name, but only two of these are of great importance from the point of view of overseas traffic, namely : Bombay and Karachi. It was not possible to visit Karachi during the tour; conditions in the port and town of Bombay are described below at some length.

The registration of vital statistics calls for mention; in municipalities this duty devolves upon the municipal staff, and in the large towns, registrars with some medical qualification are employed. In most villages it is the headman of the village who is primarily responsible for the upkeep of the registers. As in other Indian provinces, the total number of deaths from all causes is recorded, all things considered, with a high degree of accuracy. Birth registration is somewhat less accurately carried out. As regards the causes of death, the returns are less reliable. On the whole, however, the deaths ascribed to such diseases as plague, cholera and smallpox are approximately correct. In most areas more deaths are ascribed to "fevers" than to any other cause; quite recently this all-embracing term has been subdivided in the returns. "Other fevers", however, continue to be accredited with the largest number of deaths in rural areas, as is only to be expected in prevailing conditions.

In 1921, the birth-rate for the Presidency was 32.59 per mille. The proportion of male births to female was as 109 to 100—a proportion which indicates relatively faulty registration of female births, as in most other countries in the East.

The death-rate for 1921 was 26 per mille, as compared with 44.66—the mean rate for the previous five-year period. Thus the excess of births over deaths was 6.59 per thousand. The urban death-rate was 34.84, as compared with 47.28—the mean urban death-rate for the previous five-year period. The male death-rate (26.26) was in excess of the female death-rate (25.72); this is a reversal of the usual order of things.

The causes of death, according to the 1921 returns, are as follows. The figures indicate the death-rate per thousand of the population :

	Death-rates in the Bombay Presidency	Death-rates in the 113 towns of the Bombay Presidency
Cholera	0.18	0.31
Smallpox	0.09	0.20
Plague	0.24	0.45
Enteric fever	0.15	0.17
Measles	0.19	0.58
Relapsing fever	0.01	0.02
Malaria	2.13	0.94
Influenza	0.19	6.65
Other "fevers"	9.13	0.60
Dysentery	0.24	0.60
Diarrhœa	1.16	1.70
Pneumonia	1.23	5.35
Phthisis	0.85	1.57
Other respiratory diseases	2.79	4.64
Injuries	0.41	0.54
All other diseases	7.01	10.52
Total mortality rates from all causes	26.00	34.84

Of the above causes of mortality, plague, cholera and smallpox call for further comment.

Plague.

The Bombay Presidency comes third on the list of Indian provinces with regard to the total number of plague deaths that have occurred during the last 24 years. As stated elsewhere, infection was introduced in 1896, since when no month has been plague-free in the Bombay Presidency. From July 1898 till the end of June 1922, Bombay's plague-mortality bills amount to 2,341,480. As in other provinces, epidemics have varied in severity from year to year, but the worst epidemics experienced in this part of India have been incomparably less severe than the worst outbreaks in the United Provinces and in the Punjab. In only two years has the Bombay plague mortality rate exceeded 10 per thousand, namely : in 1903-1904 and 1902-1903, when death-rates of 11.96 and 11.27 respectively were recorded. Recent years have witnessed a most remarkable diminution in the intensity of the disease, and the death-rates caused by the last four epidemics from July 1918 to June 1922 have been as low as 0.99, 0.63, 0.51 and 0.24 per mille. Full information regarding the epidemic of 1922-1923 is not available at the time of writing, but from provisional figures it appears that the total plague deaths approximate 13,000—a figure which, though in excess of the totals of the previous three years, indicates a death-rate per thousand of less than unity. Space does not permit of further discussion regarding the significance of these figures.

With regard to the seasonal prevalence of plague, figures for the Presidency as a whole have less significance than the corresponding figures for other parts of India. The reasons for this have been referred to above. The great diversity of climatic conditions experienced in Bombay determines a different seasonal prevalence in the different divisions of the Presidency, and the differing intensity of the disease in these divisions from year to year is responsible for the relatively inconstant seasonal prevalence that figures for the whole Presidency indicate. In any given district the constancy of the seasonal prevalence of plague is as remarkable a characteristic of the disease as it is elsewhere.

Cholera.

The number of deaths attributed to cholera during each month of the four years 1918-1921 is set out in the following table :

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1918	782	412	184	127	367	629	1,208	1,618	867	559	203	1,878	8,834
1919	6,892	4,855	1,573	2,867	6,060	6,523	13,111	7,563	1,304	468	251	84	51,551
1920	18	58	21	4	8	127	482	564	217	423	111	14	2,047
1921	12	1	3	4	51	139	420	1,815	680	307	71	18	3,521

In no month of these four years was cholera altogether absent from the Presidency, but the cholera mortality in each of three months of 1921 and of two months of 1920 was less than ten.

As in other countries of the East, 1919 was characterised by an unusually severe epidemic, which caused 51,551 deaths. This was the most severe epidemic experienced in the Bombay Presidency since 1912. Normally, cholera in the Bombay Presidency is most in evidence during the months of July, August and September. The onset of the rains in June, washing the fouled banks of water-courses, which at that season are at their lowest, is a factor of chief importance in determining outbreaks of the disease at this time of the year. The heavy mortality noted in December 1918 and in the early months of 1919 was in large part due to an unusually heavy outbreak in Bombay city, which is referred to below. As in other provinces of India, cholera s, in very large measure, a water-borne disease, and the provision of a protected water supply to town or village, with the removal of contaminated sources, is sufficient to guarantee to such place freedom from serious outbreaks of the disease.

It will be noted that the incidence of cholera in the Bombay Presidency is neither so intense nor so constant as it is in Bengal. There are parts of the province where one must assume the disease to be endemic, but it is noteworthy that even there, as in certain other parts of India, severe epidemics almost invariably owe their origin to infection introduced from outside.

Smallpox.

The Bombay Presidency is never free from smallpox, but it is not a very important cause of either morbidity or mortality. Below are given in tabular form the deaths attributed to this disease during each month of the four years 1918-1921 :

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1918.	693	1,211	1,870	1,717	1,132	569	354	189	83	40	33	172	8,063
1919.	535	768	1,026	997	836	558	345	195	168	165	223	416	6,232
1920.	504	547	656	569	505	274	166	104	62	28	42	79	3,536
1921.	191	194	376	294	212	158	107	75	27	17	34	86	1,771

As in all other parts of British India, the attention given to vaccination has, during the past half-century or more, exceeded in amount the attention devoted to the prevention of all other causes of mortality. The amount of active opposition to vaccination is very slight; the benefits conferred are so obvious that this branch of preventive medicine has occasioned less opposition than one conversant with the habits and customs of the people might reasonably have expected. In towns, primary vaccination is compulsory and is, on the whole, very efficiently carried out. There is an admirable vaccine depot in Belgaum, which supplies most of the vaccine used in the Presidency, excluding the city of Bombay.

The City of Bombay.

Bombay, the chief port of British India, is an important industrial and commercial town, situated on the west coast of the Indian Peninsula, 18° 53′ north latitude, 72° 49′ east longitude. The climate for the greater part of the year is hot and moist. The mean maximum monthly temperature very rarely exceeds 92° F., and the mean minimum monthly temperature rarely, if ever, falls below 62° F. The mean monthly relative humidity varies between 65 per cent in December and January and 87 per cent in July—the month of maximum rainfall. The normal annual rainfall is 71 inches, the bulk of which falls during the prevalence of the south-west monsoon—June to September.

The major part of the city of Bombay lies on an island of the same name, which is connected up with the mainland by causeways, carrying roads and railways. The very fine harbour of Bombay lies between the island of Bombay and the mainland, its opening facing south.

The municipal area of the city comprises 23.54 square miles and supports a population of 1,175,914 (census 1921). This figure is 196,469 in excess of the 1911 population.

The modern parts of the town are well designed and well built, but the poorer quarters leave very much to be desired from the public health point of view, though very great improvements have been carried out during the last twenty years. Much credit is due to the Bombay Improvement Trust, which has transformed some of the worst areas of the city since plague focussed attention on the insanitary conditions prevailing at the close of the last century.

The population is poor and the standard of living is low. Sixty-six per cent of the population live in single-room tenements. Of the local industries, cotton mills employ most labour, and the cotton operatives form a very important section of the population from the public health point of view.

The administration of the city of Bombay is in the charge of a municipality. The constitution of this municipality need only be considered here in so far as its public health activities are concerned.

Municipal Health Staff and Organisation.

The executive Health Officer of Bombay is assisted by two senior assistant health officers. Under them there are seven assistant or deputy health officers in charge of the sanitary and anti-malaria work in the seven wards into which the city is divided.

The city is further subdivided into fifty sections, to each of which is appointed a medical assistant who is responsible for the sanitation and registration of the section. Applicants for these posts are now required to possess a medical qualification and to be in possession of a sanitary surveyor's certificate.

The fifty sections are grouped together to form ten registration and sanitary districts, each of which has a senior and a junior medical inspector to supervise the work of the medical assistants. These medical inspectors are under the orders of the assistant or deputy health officers of the wards in which the districts lie.

There are eleven municipal dispensaries, each in the charge of a medical assistant; these officials are in addition to any referred to above. These dispensaries are designed for the gratuitous medical treatment of the sick poor. Attached to each of these dispensaries are two trained nurses, qualified as midwives, whose duties are connected with maternity and child welfare among the poor.

Five sub-inspectors are engaged in taking samples of milk for analysis in the Municipal Laboratory.

The special malaria staff consists of one medical inspector, one medical assistant and sixteen sub-inspectors, with a large coolie staff.

There is a large veterinary staff.

The vaccination staff consists of a superintendent, an assistant superintendent and ten vaccinators.

The conservancy staff employs a personnel in excess of seven thousand.

There are two infectious diseases hospitals belonging to the municipality.

The above condensed statement of fact is sufficient to indicate the scope and extent of municipal health work in the city of Bombay. Some admirable work has been done in grappling with a task of enormous difficulty.

Space does not permit of any descriptive reference to either the Government and other hospitals in Bombay city, to the Medical College, or to the Bombay Bacteriological Laboratory, where work of much more than local fame and importance has been carried out.

Water Supply.

The water supply of Bombay is derived from four lakes at some distance from the island. In dry months of the year the supply has frequently been insufficient, and at times of doubtful quality. Additional pipe lines are being constructed, and, now that more attention is being paid to filtration, Bombay should be in possession of much more satisfactory supply than it has had in past years.

The vital statistics of Bombay still indicate very unsatisfactory health conditions and the frequent occurrence of serious outbreaks of epidemic disease. An insufficient water supply, insufficiency of the drainage system with a resultant perpetuation of the objectionable basket-privy system of conservancy in several parts of the town, and the dangerous degree of overcrowding that still persists in congested areas, are all factors of importance in determining high morbidity and high mortality rates.

Population.

As in other large Indian industrial towns, the labour force is drawn chiefly from surrounding rural districts, with the result that the sex ratio of the population is very abnormal; males largely exceed females in number. At the time of the 1921 census there were 1,906 males for every thousand females.

The population is extremely heterogeneous and comprises representatives of many Oriental races and creeds. Its composition at the 1921 census was as follows :

Banias	58,824
Jains	23,884
Brahmins	72,400
Lingaits	866
Bhatias	9,015
Other-caste Hindus	560,951
Low-caste Hindus	135,634
Mussulmans	184,685
Parsees	52,234
Jews	7,548
Indian Christians	48,719
Anglo-Indians	4,724
Europeans	14,726
Buddhists	1,645
Others	59
TOTAL	1,175,914

The density of population for the city as a whole is 78 persons per acre, being as high as 714 and 699 per acre in the two most crowded sections of the town.

Registration of Births and Deaths.

The registration of births and deaths is legally compulsory, and the number of deaths that escape registration is altogether insignificant. It is otherwise with birth registration, however, and unregistered births in Bombay city are estimated to amount to not less than ten per cent of those registered.

With regard to the cause of death, certificates are demanded from qualified medical men, but the proportion of people who receive qualified medical attention during their last illnesses is not very large. Of the 37,297 deaths that were recorded in 1922, certificates as to the cause of death were received in 8,773 cases : 3,274 from qualified private medical practitioners; 49 from *hakims* and *vaidyas*, and 4,175 from medical officers of hospitals. The Commissioner of Police certified the cause of death in 696 cases and the Coroner of Bombay in 579 cases. Of the remainder, the district registrars certified the cause of death of 48 persons after seeing them during the course of their last illnesses and ascertained the probable cause of death of 28,431 persons from information gathered from relatives of the deceased and of 45 persons after seeing the dead bodies.

Births and Birth-rates.

The birth rate of Bombay for the year 1922 was 17.03 per mille—a very low rate for an Indian town, even if allowance be made for the abnormal sex constitution of the population of Bombay referred to above, and the fact that ten per cent of births escape registration. (The birth-rate for the Presidency of Bombay in 1922 was 33 per mille, and for the Punjab 41 per mille.) The very low Bombay birth rate is, however, fallacious, for a very considerable number of women leave

Bombay City and return to their villages for their confinements. Thus, of the 5,133 children under one year of age who died in 1922, nearly one-fourth were born outside the city. For these reasons, it is hardly profitable to discuss at greater length in this place the significance of the reported birth-rates of Bombay City.

Deaths and Death-rates.

There were 37,297 deaths registered in Bombay city in 1922—equivalent to a death-rate of 31 per mille, as compared with 46 in 1921, 47 in 1920 and 70 in 1919. The latter rate has been exceeded only twice during the last fifty years, viz., in 1900 and in 1901. Below are tabulated the total deaths from all causes reported in Bombay city during each of the past 13 years, with the corresponding death-rates :

Year	Total Deaths (all causes)	Death-rate per 1,000	Year	Total Deaths (all causes)	Death-rate per 1,000
1910	34,933	35.72	1917	33,390	34.09
1911	34,961	35.69	1918	58,383	59.61
1912	38,954	39.77	1919	68,610	70.04
1913	31,806	32.47	1920	45,839	46.80
1914	31,853	32.52	1921	53,609	45.58
1915	23,681	24.17	1922	37,297	31.06
1916	30,574	31.21			

In only one year of the series did the death-rate fall below 30 per mille. The large fluctuations in the rates are indicative of frequent and serious epidemics. The death-rate for 1922 is the lowest of the series with the exception of that for the unusually healthy year 1915.

Of the 37,297 deaths registered in 1922, 8,236 concerned infants in the first year of life and 1,244 had been resident in Bombay city less than ten days. The male death-rate was 27 and the female death-rate 39 per thousand.

Infant Mortality.

The infant mortality rate in 1922 was 403 per thousand births, as compared with 667 in 1921. These appalling figures are perhaps the worst feature of the vital statistics of Bombay City. Considerations referred to when births and birth-rates were under discussion indicate that uncorrected infant mortality rates for Bombay are certainly an over-statement, but even when every possible correction has been made the rates are indicative of unhygienic conditions of the worst kind. There is an unusually close parallelism between the curves representing the infant mortality rates and the total mortality rates from all causes of Bombay City.

Causes of Mortality.

The following table gives the number of deaths ascribed to some of the more important causes of mortality in Bombay city each year from 1910 to 1922 :

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Plague	3,656	4,006	1,717	2,609	2,941	599	1,987	1,706	1,143	702	282	811	632
Smallpox	1,008	443	979	212	252	359	1,021	269	1,024	780	294	406	61
Cholera	107	123	1,790	125	221	16	141	61	1,682	8,455	119	70	15
Influenza	3	9	0	1	3	1	6	5	3,964	1,942	1,605	1,389	528
Respiratory diseases	8,212	8,640	9,686	8,604	8,734	6,770	9,649	11,231	23,487	24,055	18,737	21,982	13,614
Tuberculosis	2,839	2,694	2,794	2,152	1,889	1,710	1,902	2,118	2,513	2,780	1,841	1,614	1,473
Enteric fever	156	145	152	154	147	109	168	170	125	131	157	152	123
Malaria	293	334	360	261	213	208	238	262	200	262	311	545	485
Ague and remittent fever	2,630	2,657	3,070	2,624	2,517	1,774	1,732	2,012	4,219	5,071	3,216	4,234	2,703
Diarrhœa, Enteritis and Dysentery	3,430	3,160	4,605	3,231	3,159	2,267	2,600	2,829	3,267	5,280	3,571	4,957	3,729

The above figures indicate how large is the proportion of total deaths attributed year after year to "respiratory diseases". The great increase in the number of deaths under this head that synchronised with the influenza epidemic of 1918-1919 is noteworthy, as is the fact that there was an appreciably increased mortality attributed to "respiratory diseases" in 1917, though no epidemic of influenza was reported till the following year.

Tuberculosis is a very important cause of morbidity and death. It is probable that the figures in the table are an inadequate index of the havoc caused by tuberculosis, as sufferers in an advanced stage of this disease among the immigrant labour forces not infrequently leave the town for their homes in the country.

It is difficult to say what proportion of the deaths ascribed to ague and remittent fever is attributable to malaria. The prevalence of malaria in the city appears to have increased during recent years. The percentage of children with enlarged spleens among the many examined was 7.80 in 1922, as compared with 5.92 in 1921 and 4.41 in 1920.

Cerebro-spinal meningitis has recently been in evidence in Bombay, though it does not appear to have existed in epidemic form. Previous to 1919 it was rare, but in that year there were twelve patients suffering from the disease admitted into the infectious diseases hospitals. In 1920 the admissions numbered 23; in 1921, 80; and in 1922, 85. The case mortality rate is very high; a large proportion of the patients appear to have been admitted to hospital in an advanced stage of the disease.

Typhus fever does not occur as an epidemic disease in Bombay (or elsewhere in the low-lying plains of the Indian Peninsula, though it is not uncommon in the montane and submontane districts of the north of India), but it is otherwise with that other louse-borne infection, relapsing fever. This disease has frequently prevailed in epidemic form in Bombay and it had formerly a high case mortality rate. The admissions for relapsing fever into the two infectious diseases hospitals of Bombay during the past twenty years have been as follows :

1903. . .	275	1907. . . .	380	1911. . . .	1	1915. . . .	0	1919. . . .	458
1904. . .	139	1908. . . .	284	1912. . . .	2	1916. . . .	2	1920. . . .	82
1905. . .	424	1909. . . .	123	1913. . . .	1	1917. . . .	7	1921. . . .	151
1906. . .	813	1910. . . .	41	1914. . . .	1	1918. . . .	24	1922. . . .	162

a total of 3,855 admissions during the twenty-year period. From 1911 to 1917 the city was almost free from the disease, but since 1917 relapsing fever has once again been much in evidence.

Plague.

Of all the many epidemic diseases thats trouble Bombay, plague is the most important from the international point of view, the point of view of the present enquiry. It was in September 1896 that plague was first recognised in Bombay and the city has never been free from infection since. It was from Bombay that plague spread all over India and from Bombay plague infection is not infrequently transmitted by ships at certain seasons of the year. Though plague infection has clung to Bombay with such tenacity, the disease is no longer the serious cause of human mortality that it was during the early years of the present century. The figures reproduced in the table on the previous page show the very marked improvement that has taken place in recent years. During each of the last four years three figures have been sufficient to express the annual plague mortality of the city. Still more striking is the improvement if comparison be made with earlier plague years. Only once during the years 1910-1922 has the plague mortality rate been as high as four per thousand; between 1899 and 1905 it never fell below 16 per thousand and in 1903 and 1901 plague death-rates of 27 per thousand (20,788 deaths) and 24 per thousand were recorded. The plague death-rates per thousand of population during the past four years have been :

1919.	0.71	1921.	0.68
1920.	0.28	1922.	0.52

The monthly incidence of plague deaths during the past four years has been as follows :

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Totals
	—	—	—	—	—	—	—	—	—	—	—	—	—
1919.	5	11	112	256	218	41	20	19	9	6	3	2	702
1920.	4	27	30	77	39	24	27	34	9	4	0	7	282
1921.	5	30	132	344	185	34	18	22	22	11	2	6	811
1922.	35	73	125	163	75	23	24	37	19	25	22	11	632

In each of these four years the maximum mortality has been recorded in the month of April. The four months October to January are consistently the months of minimum incidence.

During 1922 the number of plague attacks notified was 759, which gives a case mortality rate of 84 per cent, as compared with 78 per cent in 1921, 81 in 1920 and 85 in 1919. It would seem that a certain number of mild cases escape detection and report.

During the first six months of 1923, plague deaths numbered 1,175.

The plague death-rates in 1922 were 0.58 for males and 0.40 for females. No plague death occurred during the first year of life and only one in the second.

The plague prevention measures enforced in Bombay consist of rat destruction (and examination of rats caught or found); inoculation with plague vaccine; evacuation of infected dwellings; and disinfection.

Rat destruction has been fairly energetically carried out by the Bombay municipal staff since the early years of plague. In the following table is given the number of rats collected and destroyed; the number of such rats that were examined for plague infection and the number found infected during each of the past four years :

	Rats collected	Rats examined	Infected rats	Per cent infected
	—	—	—	—
1919.	778,671	394,491	6,801	1.72
1920.	693,078	335,185	4,815	1.43
1921.	708,587	347,186	11,719	3.37
1922.	755,938	344,646	6,400	1.85

Infected rats were found in each month of all four years, the highest precentage infected being found in the months of maximum human plague incidence. *Rattus norvegicus* (*decumanus*)

and *Rattus rattus* are both very prevalent in Bombay. The number of rats found infected in comparison with the number of human cases that occur is always high, much higher than one finds in places where *Rattus rattus* is the species of exclusive plague import. Bombay is yet another example of those places where the incidence of human plague is an inadequate index of the intensity of the rat epizootic, a characteristic of most, if not all, *decumanus*-infested plague-infected ports of the East.

To encourage evacuation of infected buildings, or buildings in infected areas in congested parts of the town, the Municipality maintains temporary health camps for the accommodation of the inmates of such dwellings during times of epidemic prevalence of plague. The saving of life that has been effected in this way is probably very considerable.

The number of persons inoculated with plague vaccine in Bombay city during the past four years is as follows :

1919	3,030	1921.	15,687
1920	4,518	1922..	10,226

More than half these inoculations were performed in the prison, so it cannot be claimed that plague inoculation is a measure that has much effect on the evolution of plague epidemics in Bombay city.

All rooms in which plague cases have occurred, or in which plague-infected rats have been found, are disinfected with "pesterine", and bedding, etc., is disinfected by steam. These are measures of doubtful utility, at any rate when applied after the occurrence of the human case. This matter has been further discussed in the special plague chapter of the report.

Though the incidence of human plague has shown so welcome a decrease during recent years, the fact that cases occur, and plague-infected rats are found, in almost all parts of the city, and the very large number of plague-infected rats discovered each year, indicate how difficult a task it still would be to eradicate infection from such a crowded and congested town. The plague problem of Bombay is very much more difficult than that of any other town in the Orient. Increasing immunity to plague of the rat population will tend to a diminution of the disease, and it is important to see that that rat population is not continually reinforced by susceptible rats, either from abroad or elsewhere.

Cholera.

The table on page 168 indicates that none of the past 13 years has been completely free from cholera. Three of the years witnessed epidemics of great intensity, the worst being in 1919, when no fewer than 8,455 deaths were ascribed to this disease. During 1922 cholera was very little in evidence, only 22 cases being reported, of which 15 died; one of these cases was imported.

The serious epidemic of 1919 commenced during the last months of the previous year. The task of dealing with the outbreak was rendered more than usually difficult by a labour strike that took place at the time. The outbreak reached its height in the last week of January. Of the total 9,658 indigenous cases with 8,455 deaths that were reported during the course of 1919, 6,257 cases and 5,600 deaths were reported in January and 3,047 cases and 2,606 deaths in February. Cholera epidemics of this degree of intensity have been rare in the medical history of Bombay, and it would seem probable that a polluted water supply was responsible for the serious nature of the outbreak in question.

The epidemic of 1918-1919 was unusual in another respect. Cholera very rarely assumes epidemic proportions in the cold-weather months; usually the rainy season, June-August, is the cholera season in Bombay.

The cholera epidemic of 1918-1919 commenced just as the severe influenza epidemic of 1918 was coming to a close: a fact which is responsible for the excessively high mortality rates for these two years. The very high case mortality rate reported during the epidemic is probably an over-statement; it is likely that many mild cases were unreported. Many patients were almost moribund when admitted to hospital.

Smallpox.

The incidence of smallpox mortality during each month of the last four years is set out in the following table :

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1919.	23	57	156	202	166	95	44	11	9	7	5	5	780
1920.	13	37	89	77	38	26	5	5	0	0	1	3	294
1921.	13	41	126	100	48	33	26	10	5	2	1	1	406
1922.	4	3	10	10	10	3	3	0	1	6	3	8	61

It will be noted that smallpox is most prevalent during the first half of the year, as in many other parts of the East and of Europe. The smallpox mortality for 1922 was the lowest reported for many years; the number of cases registered in 1922 was 130, of which 11 were imported cases.

Vaccination.

Primary vaccination is compulsory in Bombay, and is effectively carried out. The lymph used is made by the Vaccination Department of the Bombay Municipality. The number of primary vaccinations and re-vaccinations performed during each of the last ten years is as follows:

Year	Primary Vaccinations	Re-vaccinations
1913	20,877	15,189
1914	20,207	12,243
1915	19,721	10,116
1916	19,215	31,746
1917	18,958	19,659
1918	18,100	45,171
1919	14,669	16,949
1920	14,463	21,825
1921	18,267	20,341
1922	18,886	8,903

Eight of the 61 smallpox patients that died during 1922 were children under one year of age; none of these had been vaccinated.

Of the primary vaccinations performed in 1922, 14,125 were children under one year of age, a figure which is 69 per cent of the total number of births recorded during that year.

The Port of Bombay.

The magnificent natural harbour is the chief feature of the port of Bombay : this affords almost unlimited anchorage for ships. The Prince's, Victoria, and Alexandra Docks, with wharves, storehouses and all the other appurtenances and equipment of a modern port, now offer most excellent facilities for shipping and maritime trade. The Ballard Pier brings ocean-going ships into contact with postal and passenger trains which connect Bombay with all parts of India. Near by there is hotel accommodation for ocean-going passengers. Very great developments and improvements have taken place during recent years.

It would be impossible within the space that can be allotted to Bombay in this report to describe the port in detail, and attention will merely be directed to a few of such of its features as appear to be of chief health importance.

The new goods-sheds and warehouses in the docks are well constructed of "rat-proof" material, but this does not signify that they are in any degree "rat-free". Attention paid to one or two details might secure appreciable improvement in this respect.

From the public health point of view the most important recent development is the erection of the cotton depot and the grain depot on reclaimed ground at Mazagaon. These are nearing completion. These depots cover an area of 127 acres and the conditions of storing now available are infinitely superior to those which they replace. The depots are served by admirable roads and railway lines. The conditions in which cotton was formerly stored in Bombay were open to criticism. Cotton forms the bulk of Bombay's exports. In another chapter of this report attention has been directed to the fact that more than once the introduction of plague into Japan has been ascribed to cotton from Bombay. Facilities existed for rats to nest between cotton bales : this involved the danger of transferring infected rat-fleas from cotton stores to ships.

The administration of the port of Bombay is in the hands of the Port Trust, the executive staff of which has carried out the very many improvements recently brought about. The Board of Trustees consists of ten members nominated by the Government of Bombay, five members elected by the Bombay Chamber of Commerce, a representative of the Millowners' Association, and a representative of the Native Piece-Goods Merchants' Association. The Trusts executive staff is subdivided into an Engineering Department, a Port Department, a Secretary's Department, an Accounts Department, a Docks Department, a Land and Bunders Department, a Railway Department, a Stores Department, and a Medical Department. The latter is in the charge of an Administrative Medical Officer who is responsible for the health and health conditions of the Trust's large personnel, but is in no way connected with port health work in the restricted meaning usually attached to that term. He has a subordinate staff, who are in charge of the three port dispensaries.

During 1921-22 the Port Trust's staff consisted of 2,222 superior officials; 512 inferior officials, and 11,172 temporary staff, exclusive of casual labour at the docks. The average daily number of dock labourers engaged was 4,906.

Goods dealt with at the docks and bunders during 1920-21 amounted to 3,322,000 tons of imports and 2,750,000 tons of exports. For 1921-22 the figures were 3,978,000 tons of imports and 2,747,000 tons of exports.

Among the articles of export and import in 1921-22 were the following :

Imports.

Rice	487,000 tons	Coal	493,000 tons
Wheat	115,000 »	Timber	125,000 »
Sugar	165,000 »	Cotton	94,000 "packages"

Exports.

Cotton	2,556,000 "packages"	"Other Grains"	60,000 tons
Rice	107,000 tons	Ground nuts	28,000 »
Wheat	5,000 »	"Seeds"	313,000 »

In 1921-22 the number of vessels that entered the docks was 1,536. In addition 592 vessels were berthed at the harbour walls. These 2,128 vessels aggregated 4,896,000 tons. Two hundred and fifty-eight vessels of a total tonnage of 826,648 were dry-docked during the year.

According to the Customs returns the value of the trade of the port of Bombay in 1921-22 amounted to 305 crores of rupees (approximately £203,000,000).

Further information regarding the trade of the port during each of the last three years is given in the following table :

Vessels entering the Port of Bombay.

Year	Foreign Steam-ships		Coasting Steam-ships		Foreign sailing-ships		Coasting sailing-ships	
	Number	Tonnage	Number	Tonnage	Number	Tonnage	Number	Tonnage
1919-1920	732	2,206,439	1,774	1,392,824	264	34,536	43,724	587,731
1920-1921	727	2,234,912	1,994	1,811,256	203	25,801	49,603	750,741
1921-1922	784	2,492,516	2,181	2,097,099	200	26,503	55,136	785,060

The port health officer of Bombay and his medical assistants are appointed by the Government of Bombay, under whose control port health work is carried on. As in other Indian ports, there is no properly constituted port sanitary authority.

The port health officer exercises medical supervision over all vessels with their crews and passengers, but none over any port areas situated on land. Thus very close co-operation is essential between the port health officer's department, the Bombay Port Trust and the Municipal Health Authority.

The port health rules, regulations and procedure have already been described for British India as a whole. It has also been pointed out that Bombay is not at present in possession of a maritime quarantine station. Butcher Island, situated in Bombay Harbour, is the site that was selected for a sanitary station by the Indian Yellow-Fever Commission. This site was inspected during the visit to Bombay : if it can be made available for the purpose, Bombay should possess a most admirable quarantine station in the near future.

In close proximity to the docks there are sanitary stations in which facilities are provided for the cleansing and disinfection of the personal effects and bodies of deck passengers and other special classes of passengers for which such procedure is considered necessary. This work is carried out under the supervision of the port health officer; the stations are adequately equipped for the special purpose which they serve.

For the accommodation of pilgrims during their stay in Bombay waiting the departure of a pilgrim ship *dharamsalas* have been built more or less in the heart of the city. These buildings, which are extremely well constructed, owe their origin to private Mohammedan philanthropy. From the public health point of view their situation close to crowded areas of the city is undesirable. During the early months of 1923 cholera appeared among the pilgrims waiting at one of these *dharamsalas*. Recourse was had to cholera vaccination with apparently beneficial results.

Infectious disease hospitals belonging to the municipality and other hospitals in the city are available for cases of sickness coming from the port. The port health officer is also able to enlist the assistance of municipal or other bacteriological laboratories in case of need.

There is an efficient Clayton apparatus at the disposal of the port health officer, which is suitable for the fumigation of ships at anchor.

The following condensed summary of port health activity in 1921 indicates the nature of the work carried out by the department. During that year 1,094 vessels with 199,595 passengers and crew were medically inspected. The clothing and belongings of 93,504 passengers and crew were disinfected. Of this number 7,348 were pilgrims and 9,678 were from vessels on which a case or cases of infectious disease had occurred.

Twelve pilgrim ships and 14 other vessels were fumigated by the port health officer's staff. Twenty other vessels were fumigated by the Clayton apparatus belonging to the British India Steam Navigation Company. Eighty-seven smallpox contacts were vaccinated, as were 6,877 outward-bound pilgrims.

Thirty-eight "infected" vessels arrived in port. On these vessels were four cases of plague; 16 smallpox; 12 measles; 13 chicken-pox; seven jigger, and 351 cases of mild influenza.

Twelve pilgrim ships arrived carrying 5,827 pilgrims : one of these ships had had a fatal case of smallpox during the homeward voyage. The total deaths on board these vessels were 146.

Outward-bound pilgrims numbered 7,348, as compared with 18,000 in 1920. Twenty-four deaths occurred on the outward voyage, most of them being attributed to such causes as general debility, pneumonia, old age and heart disease.

In the vessels lying in the port of Bombay during 1921 there occurred two cases of plague, six of cholera, five of smallpox, four of measles, four of chicken-pox and six of influenzal pneumonia.

XXIV — CEYLON

Ceylon is a small island, pyriform in shape, lying close to the southern extremity of the East Indian peninsula, from which it is separated by a narrow strait 20 miles broad. It covers an area of 25,481 square miles and supports a population of 4,497,686 (census 1921). The island lies entirely within the tropical zone and, at low levels, has a hot and moist climate with little marked seasonal variations. At high elevation in the hill country in the southern half of the island cool temperatures can be enjoyed. Both the north-east monsoon, October and November, and the south-west monsoon, April to July, bring plentiful rain.

The soil is fertile and the island is almost entirely agricultural. Tea, rubber and coconuts are the most important products grown and on them the prosperity of Ceylon in large measure depends. The island does not produce sufficient food for its own requirements and large quantities of grain, chiefly rice, are imported annually.

The population is heterogeneous; at the 1921 census it had the following constitution :

Sinhalese	3,016,400
Tamils	1,120,600
Moors	284,700
Burghers and Eurasians	28,900
Malays	13,700
Europeans	8,400
Others	24,900
TOTAL	4,497,600

Males were in excess of females in the proportion of 112 to 100.

The majority of the labour forces on the tea and rubber plantations are Tamils, from Southern India.

A Governor, assisted by a Colonial Secretary, is at the head of the Central Government. The Legislative Assembly has large and increasing powers.

For purposes of administration the island is divided into nine provinces, each in the charge of a Government Agent. Colombo, with its population of nearly a quarter of a million, is by far the largest town in Ceylon. Jaffna (population 42,436) in the Northern Province, Galle (39,073) in the Southern Province, Kandy (32,561) in the Central Province, Moratuwa (41,858) and Negombo (27,639) in the Western Province, come next in size. Only five other towns have a population in excess of 10,000.

The head of the medical service and the chief adviser to Government in medical and health matters is termed the Principal Civil Medical Officer. He is assisted by a Sanitary Commissioner and a Deputy.

The island is well provided with hospitals and dispensaries. In 1921 there were 78 Government general hospitals, with accommodation varying from 16 beds in hospitals in small out-stations to 711 in the well-equipped General Hospital in Colombo. The number of beds in these hospitals totalled 5,570. There are also a number of special hospitals and institutions in or near Colombo. During 1921, 171,066 patients were admitted to these hospitals.

Over and above these general hospitals there are in the island 475 Government dispensaries. The total number of out-patients treated in 1921 was 2,111,536. Lastly, there are 68 estate hospitals and 480 estate dispensaries supported by the owners of plantations.

All the medical officers of these hospitals and the apothecaries in charge of dispensaries are natives of Ceylon. There is a medical college in Colombo, where, on December 31, 1921, there were 219 medical students and 47 apothecary students.

The registration of vital statistics in Ceylon is in the charge of a Registrar-General; this post was founded as long ago as 1867. The registrars in Colombo have medical qualifications, as have provincial registrars wherever possible. In 33 towns to which the Ordinance of 1895 has been applied, the medical registrar has to inspect the bodies of all dead persons in the absence of a medical certificate as to the cause of death. In small villages the headman acts as registrar. It would appear that births and deaths are recorded with a degree of accuracy not commonly surpassed in the East. As to the cause of death the returns from rural areas naturally leave much for speculation; the urban returns are of greater value.

The birth-rate of the island in 1921 was 40.8 per mille, as compared with 36.5 in 1920, and 36.0 in 1919. The proportion of male to female births is generally in the neighbourhood of 104 to 100, a normal ratio.

The death-rate of Ceylon in 1921 was 31.2 per mille, as compared with 29.6 in the previous year. The urban rate was 34.7. The infant mortality rate for the island was 192 per thousand births. Deaths of children under five years of age accounted for 44 per cent. of the total mortality.

COLOMBO.

Colombo, the capital and chief town of Ceylon, is a port of call of great importance. It is the only port in the island which calls for consideration in this report. As a port it is relatively

modern. During the early years of the British occupation of the island, Galle, which is situa at the south-west corner of the island, was the chief port of commerce. In 1866 it was decid to develop the port of Colombo, as the resources of Galle were insufficient for the rapidly developi trade of the island and for the larger ships then beginning to come into use. The work was imm diately put in hand, and almost each year since then has seen some further development in t port of Colombo.

The town of Colombo is situated on the west coast of Ceylon. The port is an artificial on A south-west breakwater, a north-west breakwater, and a shorter one that faces almost d north enclose a large area of water that provides admirable mooring facilities for vessels of t largest size. A portion of this area is being dredged to a depth of 36 feet at low water, and vesse of 33-feet draught can now enter the harbour at all states of the tide. Ships do not come alongsi the quays and wharves : the loading, unloading, and transhipment of cargo is carried out by mea of lighters, a proceeding which has certain advantages from the health point of view.

Colombo's chief exports are tea, rubber, and coconut products. The chief import is rice. T quantity of rice imported in 1922 totalled 360,000 tons, of which Burma supplied 278,000 ton

The amount of tea exported in 1922 weighed 172 million pounds; of this, 117 million poun went to the United Kingdom. Products of the coconut palm exported in 1922 approximate 27,700 tons. Over 100 million pounds of rubber were also exported.

The port area is compact and well administered. The stores and godowns on wharves an quays are well arranged and for the most part well constructed. The new export stores a excellent, but the import godowns are still capable of some improvement. The wharves a joined up with the railway system of the island. Further reference to the harbour will be mad when port health procedure is under consideration.

The town of Colombo is built on low-lying land : many large swamps still remain withi municipal limits, a fact which explains the very large area occupied by the town in proportio to its population. The residential and the chief business quarters of the town are well laid ou and well built. The roads are for the most part excellent. Most of the native houses are of on story only. In spite of the many improvements that have taken place during recent years ther remains a crowded portion of the town adjacent to the harbour which leaves much to be desire from the health point of view. It is this area which is the only persistent focus of endemic plagu in the island.

The administration of Colombo is in the hands of a municipality, consisting of ten electe members, nine nominated members, and an official chairman also nominated by Government the chairman is mayor of Colombo. The Principal Civil Medical Officer of Ceylon is one of th nominated members of the Municipal Council. The Public Health Department of the municipalit consists of a Medical Officer of Health and two medical assistants, a bacteriologist, and two cit analysts. There are in addition two engineers in the Waterworks Department, and two in th City Sanitation Department. There is an adequately equipped Municipal Bacteriological Labo ratory. The general work of the municipal Health Department is of a very high level of effi ciency.

There is also a Government Bacteriological Laboratory and Pasteur Institute in Colombo, i which some admirable research work has been done. The infectious diseases hospital is primitive the construction of a more up-to-date epidemic diseases hospital has long been under consi deration.

The water supply of Colombo is in most respects extremely good, an upland surface wate derived from a reservoir formed by damming a valley some 30 miles from Colombo. The catch ment area is free from risk of harmful pollution. The dam is now being heightened ten feet which will ensure an adequate supply for many years to come. In times of drought, whe there is insufficient water for the regular flushing of the water mains, trouble has been experience in the past by the activity of iron bacteria and the incrustation of water mains. At such times th supply is apt to be unpalatable, though quite "safe". The raw water is passed through a Jewel filtration plant.

The climate of Colombo is warm and humid throughout the year, never excessively hot and never cold. The monthly mean temperature is lowest in December and January, 79° F. highest in April and May, 82.6° F. The average mean monthly humidity is lowest in January and February, 76 per cent, and highest in October and November, 82 per cent. October, Ma and November are the months of maximum rainfall; the average rainfall of these months ar 13.12, 12.24, and 10.51 inches respectively. February is the driest month, when the average fal is only 1.82 inches. The average annual rainfall (14 years) is 78.91 inches.

The population of Colombo at the census of 1921 was 244,163. Of these, 114,600 were Sin halese, 54,153 Tamils, 39,692 Moors, and 14,863 Burghers. Europeans numbered only 2,836.

The birth-rate in 1921 amounted to 35.7 per mille, as compared with 24.7, the average rat for the previous decade.

The death-rate for 1921 was 33.5 per thousand, or 28.8 if the deaths of non-residents wh died in Colombo hospitals be deducted from the total deaths. The crude and corrected rate for the previous decade were 30.0 and 29.0 per mille respectively. Of the total 8,169 deaths 1,870 were ascribed to pulmonary diseases (950 pneumonia and 737 phthisis), 831 to diarrhœa diseases, and 400 to "fevers". Infant mortality was equivalent to 240 per thousand births, a compared with 252, the decennial mean rate.

In the following table are set out the cases of infectious disease, notified each month during 1921, from the municipal area of Colombo.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Port cases	Outside cases
Fgue	65	53	27	7	2	1	3	2	2	9	4	9	184	2	9
Olera	—	—	—	—	—	—	*Nil*	—	—	—	—	—	—	*Nil*	*Nil*
Sallpox	10	1	—	1	—	—	—	—	—	—	—	—	12	3	—
Cken-pox	69	83	144	141	50	11	18	57	46	37	32	23	711	6	56
Nasles	28	18	35	30	10	39	9	9	2	—	6	4	190	4	13
Iphtheria	4	1	1	1	4	1	—	3	1	1	2	1	20	1	2
Eteric	62	34	37	34	27	21	30	28	41	32	27	25	398	12	162
Fhisis	164	114	106	140	162	105	121	89	101	110	86	69	1,367		

In addition there were 187 cases of "continued fever" and two cases of "acute diarrhœa" rtified. There was no case of scarlet fever and no case of typhus fever.

To influenza were ascribed 191 deaths, as compared with 253 in 1920, 421 in 1919, and "about 1000" in 1918.

Cerebro-spinal fever does not appear to occur in Ceylon.

There were 793 admissions into the Infectious Diseases Hospital of Colombo during 1921, rmely : 37 cases and six deaths from smallpox; 54 cases and 43 deaths from plague (50 bubonic ad four septicæmic cases); three cases and one death from diphtheria; 498 cases of chicken-pox, c whom one died; six cases and one death from whooping cough; and 53 cases of measles.

The incidence of the three diseases of chief importance to the present inquiry, plague, cholera, ad smallpox, will be considered for Ceylon as a whole.

Plague.

The history of plague in Ceylon is of very great interest and calls for somewhat detailed nsideration in this report. The valuable observations that have been recorded and the interesti investigations that have been carried out make the study a profitable one. Moreover, the edeavours that have been made to eradicate the disease have been better directed and more ergetically carried out than in the majority of countries in the Far East.

Plague infection was brought into Ceylon at the end of 1913 or beginning of 1914; the first human case was detected on January 24th of the latter year, in Colombo, and it is doubtful whether te city of Colombo has ever been completely free from plague infection from that date till the resent time. It will be recalled that Bombay first became infected in 1896 and the fact that 1 years elapsed before infection was successfully implanted into Colombo is of extreme significance. Cain as usual appears to have been the vehicle by means of which infection was brought to the iand. Cargoes of rice from Negapatam were incriminated : it is interesting to note that 1913 vtnessed the first outbreak of plague in that Madras port. In those years Ceylon was dependent c India for the larger part of its supply of rice; at present most of the imported rice comes from Burma.

The number of plague cases that have been reported each month in Colombo from January 1914 to the end of 1922 is given in the following table :

	1914	1915	1916	1917	1918	1919	1920	1921	1922	Average monthly incidence
January	4	19	17	25	13	—	25	65	13	20
February	67	6	18	40	18	1	20	53	10	26
March	58	3	18	61	10	3	3	27	6	21
April	28	3	14	34	11	—	3	7	2	11
May	29	3	11	11	2	—	4	2	7	8
June	49	1	26	3	9	—	3	1	8	12
July	47	5	43	6	2	—	12	3	10	14
August	40	20	35	1	1	2	7	2	7	13
September	18	21	25	3	—	5	18	2	7	11
October	23	24	24	7	—	18	28	9	14	16
November	24	10	25	10	2	34	34	4	19	18
December	26	24	25	6	2	24	78	9	33	25
Annual Totals	413	139	291	207	70	87	235	184	136	

During the first six months of 1923, 110 cases of plague were notified in Colombo.

From time to time plague infection has been carried to other parts of the island, but it has never given rise to serious epidemics and it has always been readily eradicated. The most troublesme of these provincial outbreaks was reported from Galle in September 1922. Sixteen cases ad thirteen deaths were reported from Galle within a period of six weeks, after which the outbreak came to an end. Twenty-six infected rats were found.

The table reproduced above indicates that plague in Ceylon has never been a very serious cause of human morbidity or mortality. The number of cases is small for a town with a population of nearly a quarter of a million. Plague infection has, however, been remarkably persistent : only seven months during the nine and a-half years have been completely free from human plague. It is possible that the disease died out completely in 1919; if this be so, infection was very rapidly reintroduced.

The admirable spot maps that are reproduced each year in the informing health reports of the Colombo municipality indicate that the neighbourhood of Sea Street, the crowded insanitary locality in proximity to the docks, is by far the most important focus of endemic plague in the town, perhaps the only persistent focus. It was in the rice-stores in this quarter of the town that plague infection first appeared. As has been stated already, a large quantity of that rice had come by ship from Negapatam, an adjacent Madras port which was then undergoing its first

outbreak of plague. Since that date very great improvements have been made in the conditio under which the wholesale grain trade is carried on in Colombo. The markets and stores th have been constructed are an enormous improvement on the primitive stores that they replace but some of the retail shops and stores in Colombo are still far from satisfactory and afford foo and shelter in abundance for rats. Moreover, in the quarter of the town in which infection persis with such tenacity a complicated system of very old ill-constructed underground surface-wat drains affords shelter for rats that is difficult to deal with : these drains date from the Dutch occup tion of the island.

Since 1911 the writer of this report has drawn repeated attention to the all-importance the grain trade in the dissemination of plague infection. The conclusions arrived at were base chiefly on Indian experience : the plague history of Ceylon affords perhaps even more convincin arguments in favour of the contention than even the plague history of India can afford. Nearl every health report of Colombo emphasises the point which is realised and acted on by the healt authorities in Colombo as nowhere else. Their plague policy appears to have been well directe from the start and it is doubtless due to this fact that the disease has not caused more sufferin than it has. Provided that efficient steps are taken to guard against the re-introduction of infe tion from overseas, it is certain that the continuation of the present plague measures in Colomb will result in the eradication of the disease from the island at no very distant date. That th measures taken to prevent such re-introduction of infection are at present insufficient appea evident from a study of recent reports and spot maps. In 1921 infection was certainly re-intr duced into the import store-houses of the Port Commission. At the present time the chief dang appears to lie in ships coming from Rangoon with cargoes of rice. This matter is further discusse in the section of the report dealing with Rangoon and in the general section dealing with plague.

The two years 1918 and 1919 were characterised by the lowest incidence of plague since infe tion was imported. The recrudescence during the last quarter of 1919 was associated with th failure of Indian rice supplies and the consequent importation of other kinds of grain, which wer stored in primitive rat-infested godowns in the city; imported rice goes to the improved Gover ment granaries.

Plague in Colombo has been characterised throughout by the predominance of so-calle "septicæmic" cases, which until 1920 were considerably more numerous than bubonic cases during the last three years, however, bubonic cases have exceeded "septicæmic" cases i number (1). In other words, human plague in Colombo has been of a very grave type. Thi is reflected in the extremely high case mortality rate. The case mortality rate of all cases recorde up to the end of 1921 was 93.6 per cent and, for 1922, 96.3 per cent. The case mortality rat of "septicæmic" cases was 100 per cent : of bubonic cases up to the end of 1921 it was 87. per cent. All these case mortality rates are considerably higher than any that have been observe in carefully watched outbreaks in British India. In India, when circumstances are such that few if any, mild cases escape observation, the case mortality rate rarely, if ever, exceeds 70 per cent an is sometimes less. The question as to the possibility of mild cases being overlooked in Colomb naturally presents itself : it is difficult obviously to discover all cases in a city the size of Colombo but those best qualified to judge are of the opinion that very few cases go unrecorded.

The unusually marked prevalence of septicæmic cases in Colombo has led local experts t emphasise repeatedly the possibility of infection being conveyed from man to man through th agency of ectoparasites, the degree of septicæmia in human cases being so much higher, apparently than is commonly observed in British India. One must admit the possibility of this taking place but a study of the records fails to reveal any evidence that such a method of transmission is, o has been, of the least practical importance. For example, no case has ever been observed amon the very numerous "contacts "of plague cases that have been kept under observation, and non of the numerous cases that have left Colombo for other places in the island during the incubatio stage of the disease have ever been known to infect other persons directly. On the other hand the association between human plague and rat plague has been surprisingly clearly demonstrate in Colombo, a fact illustrated in nearly all municipal health reports and one which evidences th careful manner in which the rat population is kept under observation. These matters have bee considered in somewhat greater detail in the section of this report dealing with plague in the Fa East as a whole.

Some admirable work has been done in connection with the study of the rats and the rat fleas of Colombo and reports dealing with these matters form a most valuable contribution t plague literature. Hirst's observations are worthy of most careful consideration : they are dis cussed elsewhere. Here it may be stated that the most common rat-flea is *Xenopsylla astia* *Xenopsylla cheopis* occurs, but is confined almost entirely to those quarters of the town whic are or have been plague-infected. It would appear that *Xenopsylla cheopis* is an importe flea and Hirst is of opinion that its presence is necessary for the development of plague i Ceylon and that its absence or relative rarity explains the long immunity to plague whic Ceylon enjoyed, and the limitation of the disease to a relatively small focus in Colombo city The validity of such an assumption would appear to rest on the ability or otherwise of *Xenopsyll astia* to convey infection from rat to rat and from rat to man. Observations regarding this matte are somewhat discordant. As this important question of epidemiology is one that concerns othe countries as well as Ceylon, a further discussion will be reserved to the general plague section o this report.

Rattus rattus and *Rattus decumanus* are both common in the town and port of Colombo an both are important from the point of view of plague.

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(1) Of the 54 cases treated in hospital in 1921, 50 were "bubonic" and only four "septicæmic"; there were 43 deaths.

Plague Prevention.

Plague preventive measures as carried out in Colombo can be considered under two heads : (1) measures of permanent utility, and (2) measures of temporary benefit.

In the former category are the erection of the Chalmers Granaries, the Manning Market and ...er "rat-proof" boutiques and store-houses; the improved stores and godowns in the port; ... extension of the drainage system, accompanied by the obliteration of the old underground ...rm-water drains, and town improvement generally. A praiseworthy amount has been done ...these directions, but a good deal still remains to be accomplished.

Of the measures of temporary utility the most important are concerned with direct attacks ...on the rat population and rat-breeding places. In addition to systematic trapping and poi...ning of rats, plague-infected and neighbouring houses in the poorer quarters of the town ... systematically cleared out; the tiled roofs are in part removed so as to disclose rat-nests; the ...ole house and contents are cleansed; rat-holes, drains and the like are fumigated with sulphur ...xide, small Clayton apparatus, of which there are about a dozen in constant use, being ...ployed for the purpose. Minor repairs are executed and rat-holes and runs are filled up. ...ch energetic measures have been employed for the past three years and have undoubtedly done ...ich to limit the spread of the disease. It is gratifying to note that there has been no oppo...ion on the part of the population to the prosecution of such measures; on the contrary, their ...ive co-operation has been forthcoming, which is testimony to the utility of the work done. ...e staff engaged on these measures consists of one inspector, five overseers, nine masons, ... coolies and one carter.

The number of rats trapped and found dead during the past few years is as follows : 1920, ...9,874; 1921, 163,281; 1922, 175,577. A large number of rats are examined in the Municipal ...boratory daily; during 1922 the number of rats examined was 33,827, of which 57 were found ... be plague-infected.

Cholera.

Cholera is not an endemic disease in Ceylon and, up to the middle of 1923, no indigenous case ... been reported since the first quarter of 1920. Relatively small outbreaks have been of frequent ...currence in past years, and it was formerly exceptional for a year to go by without a case or ...ses being reported. Past records show no cholera-free periods comparable in length to the ...e Ceylon is now enjoying. Below is given the number of cases reported each year from 1914 ... 1920.

1914	55	1918	4
1915	19	1919	628
1916	67	1920	115
1917	Nil		

The last cases of indigenous cholera notified in Colombo were four cases in November 1918. ...ases of cholera have been found on ships in the harbour since that date : ten such cases occurred ... 1919.

Infection introduced from British India is believed to have been responsible for most of the ...olera epidemics of the past. In the last year of the last century, quarantine camps were estab...shed, and all estate coolies and third-class passengers from India are liable to be kept in such ...mps for a period of six days before being allowed to enter the island. Severe outbreaks of cholera ...ave been of less frequent occurrence since the establishment of such camps (1) than they were ...reviously.

Smallpox.

Smallpox is not a very serious cause of morbidity or mortality in Ceylon. The number of ...ases recorded during recent years is as follows :

1914	409	1919	35
1915	451	1920	126
1916	78	1921	18
1917	105	1922	337
1918	240		

Usually it is the Western Province that suffers most, but during 1922 the Eastern Province, ...here the incidence is usually low, was responsible for 231 cases. The case mortality rate is not ...ery high; in 1922, 43 of the 337 patients died.

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(1) The largest and mosti mportant of these quarantine camps s stationed at Mandapam, on the Indian side of the narrow strait ...eparating India from Ceylon. This camp was not visited during the course of the present tour, but the writer was privileged to see ...t some years back. The camp is administered by the Ceylon Government : it is well equipped and in every way satisfactory for ...he purpose. The total number of immigrants who passed through the camp in 1922 was 125,846, of whom 78,106 were estate labourers. ...Of the remainder only 28 per cent were detained for the full period of six days, the rest being allowed to report themselves on arrival ...n Ceylon. During 1922 the following cases of infectious disease were notified from the camp : cholera, one case; smallpox 13; ...chicken-pox 37; measles 19; and mumps four

Ninety-five estate labourers and 22 passengers were rejected on medical grounds as unfit to go to Ceylon. Sixteen of the 22 passengers rejected were lepers. Ninety-two thousand coolies and passengers were vaccinated during the year.

Between 1914 and the end of 1921 there occurred among persons detained at Mandapam, 125 cases of cholera, two of plague, and 59 of smallpox.

The incidence of smallpox in the town and port of Colombo during recent years has beer follows :

	Cases from Town	Cases from Port	Outside cases	Total
1918.	36	6	6	48
1919.	3	17	1	21
1920.	75	21	18	114
1921.	12	3	0	15
1922.	34	7	1	42

Primary vaccination is compulsory in Ceylon and appears to be efficiently carried out. T Government vaccination staff in 1921 consisted of nine provincial inspectors of vaccination a 141 trained vaccinators under the supervision of provincial surgeons : in that year the numl of primary vaccinations performed was 127,102. In Colombo in 1920 there were 7,197 birt recorded and 7,159 primary vaccinations performed; in 1921 the births numbered 8,724 a primary vaccinations 6,162. The number of vaccinations performed in the quarantine camp Mandapam has been referred to above. The vaccine lymph used is made in Colombo; it giv very satisfactory results.

Port Health Organisation.

The port health work at the ports of Ceylon is carried out under the direction of an offici government board entitled the Board of Immigration and Quarantine. On this Board, whi was formerly known as the Plague Committee, all bodies having direct interest in port heal procedure are represented. The Chairman of the Board is usually the Principal Collector Customs. The Board also administers the quarantine camp at Mandapam which is referred above.

The port activities of Colombo are in the charge of the Colombo Port Commission, whi is also presided over by the Principal Collector of Customs. In addition to five *ex-officio* offici members, this Commission has unofficial members nominated by the Ceylon Chamber of Commer and a member nominated by the Governor of Ceylon. The Commission has a General Administr tion Department, a Master Attendant's, Department and a Harbour Engineer's Departmen The Commission was brought into being ten years ago and has done much to increase and impro shipping and trading facilities and port development generally. The harbour is now well provide with storage and wharfage and the extensions of the harbour railway now being undertaken wi bring the railway system of Colombo into more convenient communication with the port. A can has been recently constructed which connects the harbour with the Colombo Lake, allowing fo the passage of barges from the harbour to the lake-side warehouses. Large oil depots have bee installed and good facilities now exist for bunkering with oil.

During 1922 the number of merchant steamers arriving in Colombo was 2,257, with a gros tonnage of 13,623,886. In addition 56 warships and 14 transports arrived in the harbour.

The Port Health Department consists of a port surgeon and three medical assistants wit subordinate personnel. During 1922, 2,323 British and foreign steamers and 281 native sailing vessels were inspected. Seven of these vessels were found to be infected with smallpox : thre from Singapore and Penang; three from Calcutta and Madras, and one from Akyab. Four c these were large passenger-ships.

The water-boats are well supervised and water therefrom is frequently sent for analysis.

There is a good disinfecting plant at the base of the South-West Breakwater. Here, too, ther is accommodation for native crews sent from India to join ships calling at Colombo : such men ar kept under observation for twelve days. They are generally vaccinated and disinfected a Mandapam.

There is a quarantine camp at Ragama, about nine miles inland from the port, with whic the port is directly connected by rail. Though not so convenient as a quarantine station mor easily accessible from the harbour, it has on several occasions proved of the utmost service.

During 1922, 1,697 bills of health were issued.

All barges and lighters used in the harbour are fumigated with sulphur dioxide at least onc a fortnight. There are about 300 such lighters in use at present.

Port health procedure is governed by rules and regulations framed under the Quarantin and Prevention of Diseases Ordinance 1897. In these rules the term disease means "any diseas of a contagious, infectious or epidemic nature, particularly plague, cholera, smallpox, yellow fever typhus exanthematicus, trypanosomiasis". The definitions of "infected", "suspected" anc "healthy" vessels are practically identical with those of the International Sanitary Convention All vessels, whatever their port of origin or whatever the state of the vessel, are boarded by th port surgeon, or health officer, immediately on arrival in Colombo and no person except a pilo is allowed on board any vessel without the consent of the port surgeon or health officer. Ship in Colombo harbour are never granted free pratique, as that term is usually understood, but they are permitted to "work in quarantine". This modified form of pratique is said to work to the advantage of all concerned, given the conditions in which ships work in Colombo harbour : nc one is allowed on board ships without a permit, and the port authorities have full control of communication between ship and shore. It is somewhat anomalous to see ships flying the qua- rantine flag having what appears to be free intercourse with the shore. All vessels arriving in the port must display the quarantine signal, and they keep it flying until their departure.

The master or surgeon of any ship arriving in the port is required to fill in a comprehensive Declaration of Health form, giving all information necessary for an opinion as to the likelihood

f the ship being in any way dangerous to the public health. Suppression of information or false eclaration made in the filling up of such forms is liable to six months', imprisonment, or a fine, r both. Passengers from healthy vessels who have left an infected port within a period less ıan the incubation period of the disease in question are kept under observation or surveillance s circumstances dictate. The clothing and effects of deck passengers are disinfected. A form f guarantee has to be signed by all passengers submitted to surveillance.

Careful attention is paid to the cleansing and disinfection of coaling coolies and coolies mployed in the handling of cargo. During 1921, 3,849 tally-clerks, 52,305 cargo-coolies, 5,875 coal coolies, and 61,492 passengers were "disinfected".

A clinic for the treatment of venereal disease among seamen is installed in the port surgeon's ffice.

The port is furnished with two Clayton apparatus for the fumigation of vessels at anchor : nly thirteen vessels were fumigated during 1922. Colombo is a port of call rather than a terminal ort.

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LEAGUE OF NATIONS

Health Organisation

THE STANDARDISATION OF DYSENTERY SERUM

FIRST REPORT

BY

Kiyoshi Shiga, H. Kawamura and K. Tsuchiya

The Kitasato Institute for Infectious Diseases

Tokyo, Japan

GENEVA, 1924

COVERING LETTER

To Dr. Th. Madsen, President of the Health Committee of the League of Nations :

We have the honour to forward a report on the method of standardisation of dys
tery serum (Shiga type), which the Kitasato Institute had been requested to investig

There are still a few unsolved questions, which will be included in a second rep
The present report embodies the results of a series of examinations extending ov
year and a-half and includes the preliminary examinations of the standardisatio
dysentery serum (Shiga type) and the method of preparation of toxins and imm
sera. The standardisation method of the serum is included in the present report.

We wish to acknowledge that a part of the expenses for this work has been defr
by a grant of the League of Nations.

June 1923.

(*Signed*) KIYOSHI SHIGA,

The Kitasato Institute for Infectious Diseases, Tokyo, Japan.

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PREFACE

For the past twenty years, specific therapy has been one of the most progressive most active branches of medicine and has undergone an extraordinary develop- t. The serum therapy of diphtheria and of tetanus has been perfected. Dysentery m is coming into therapeutic use. But the most difficult question which remains ttled is the standardisation of the serum. We were offered an opportunity to study question extensively, and we endeavoured to devise some method by a series of experi- ts by which the standardisation of dysentery serum (Shiga type) could be effected the standardisation of tetanus or diphtheria antitoxins. We suggest a method of dardisation which we believe to be the most practicable. This method, of course, uires testing by the scientific world before final adoption.

In the question of selection of toxin-materials for production of immune serum, found an unexpected result, which, however, proved concretely that the method have hitherto used for immunisation of animals has been suitable. In immunisation n animal with dysentery-bacillus (Shiga type), a filtered toxin of three-weeks bouillon ure was found to be unsuitable. On the other hand, it was found that heated bac- grown on agar medium or the autolysed bacteria were most suitable. We believe these facts offer a good basis for the study of the nature of dysentery toxin. The ussion on the question, however, will be deferred to some other date.

The standardisation of the antitoxin of dysentery serum must be carried out accu- ly by establishing a standard serum like diphtheria serum. Whether or not a serum tested with antitoxin standard will correspond with the clinical effects requires lical experience.

June 1923.

KIYOSHI SHIGA,

The Kitasato Institute for Infectious Diseases,

Tokyo, Japan.

THE STANDARDISATION OF DYSENTERY SERUM

First Report

PREPARATION OF THE DYSENTERY TOXIN AND SERUM TEST

By Kiyoshi Shiga, H. Kawamura and K. Tsuchiya

CHAPTER I

Methods of Preparation of Strong Toxin

There are many reports concerning the preparation of dysentery toxin. The filtrate of bouillon culture, the autolysed bacteria or the bacillus extract (Neisser and Shiga's free receptors) had been prepared. In order to determine a certain method by which a strong toxin can be prepared we carried out a series of experiments with toxins obtained by keeping various cultural factors under control.

A. THE RELATION OF CULTIVATION TIME AND TOXIN PRODUCTION OF THE DYSENTERY BACILLUS

We all know that the length of culture causes marked differences in the toxicity of dysentery toxin produced in bouillon. Todd considers that a four-to-six-weeks culture contains the strongest toxin, while Fukuhara claimed to have obtained it with a three-weeks culture. We prepared the following media and observed the relation of the length of cultivation to toxin-production.

Preparation of bouillon media: Boiled 500 grams of horse meat in 1,000 cc. of water and filtered. To the filtrate added 10 grams of Teruuchi's peptone and 5 grams of salt. Heated to solution point. Added KOH to make alkaline. Then filtered again. In each large test tube placed 20 cc. of the bouillon and heated for one hour to sterilise. To ensure that sterilisation was complete, incubated the media at 37 degrees for twenty-four hours. One loopful of Shiga type dysentery organisms was planted into each test tube. The reaction of the media before the incubation was PH 8.0.

A certain number of days after the incubation, carbolic acid was added to the test tubes to the extent of 0.5%, and they were kept in a dark cool place until their use. The lethal dose was determined by injecting the toxin into the ear vein of rabbits.

The following strains of the Shiga type dysentery bacillus were used in the experiments: Nos. 10, 16, 27 and 33. In order to ensure more accurate results, the experiments were repeated with strains Nos. 12, 15, 17 and 25.

The results of the experiments in brief are as follows:

Experiment I. Four-days culture. The lethal dose was from 0.1 to 0.05 cc. per kilogram of the body weight of rabbit.

Experiment II. One-week culture. The lethal dose was from 0.05 to 0.025 cc. per kilogram of the body weight of rabbit.

Experiment III. Two-weeks culture. The lethal dose was from 0.025 to 0.01 cc. per kilogram of the body weight of rabbit.

Experiment IV. Three-weeks culture. The lethal dose was 0.025 to 0.05 cc. per kilogram of the body weight of rabbit. The toxicity appeared to have somewhat decreased.

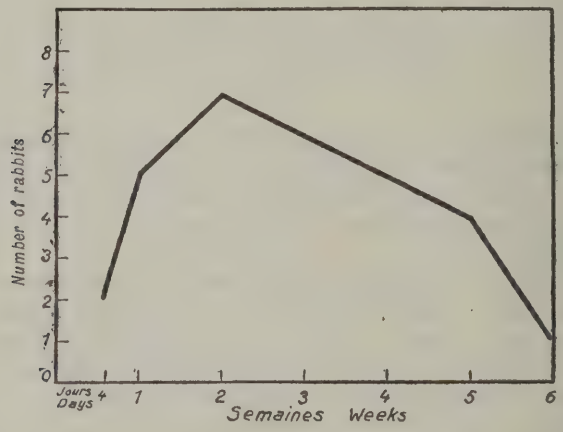
Experiment V. Four-weeks culture. One-half of the experimented animals died with a dose of 0.05 cc. per kilogram of the body weight of rabbit.

Experiment VI. Five-weeks culture. The same as above.

Experiment VII. Seven-weeks culture. Only one died out of a group of eight rabbits with a dose of 0.05 cc. per kilogram of the body weight of rabbit.

According to the foregoing experiments, the number of rabbits died out of each group of eight animals throughout all the strains by injecting a certain amount (0.05 cc.) of the dysentery toxin into the ear vein of rabbits are graphically shown as follows :

TABLE I



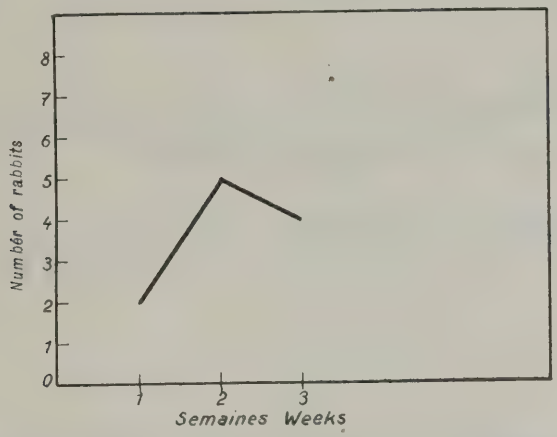
Thus the two-weeks culture showed the largest death rate, but there is not a marked difference from one to three weeks cultures. In order to ensure the results more accurate the experiments were repeated with the other strains of Shiga type dysentery bacillus. The results were as follows :

Experiment VIII. One-week culture. Two died with typical toxic pictures out of a group of eight rabbits when 0.05 cc. per kilogram of the body weight of rabbit was injected.

Experiment IX. Two-weeks culture. Six out of a group of eight rabbits died when injected the same amount as above.

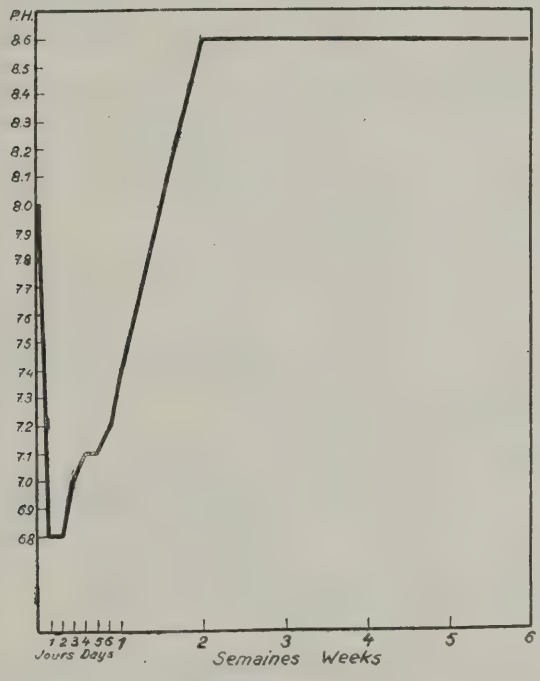
:periment X. Three-weeks culture. Four died out of eight rabbits. The foregoing results may be shown graphically as follows :

TABLE II



It appears from the foregoing experiments that the toxicity of bouillon culture of ɾsentery bacillus rapidly increases in from one- to two-weeks cultures and tends gra-ıally to decrease in from three- to four-weeks cultures. The alkalinity of the bouillon

TABLE III



ıltures of strain No. 33 in the experiment was tested from time to time. As shown in ıble III, it markedly decreased during the first day of the culture and then gra-

dually recovered. It rapidly increased from the first to second weeks and reached maximum. Throughout the third and fourth weeks it remained at the maximum lev and did not decrease with the decrease of the toxicity.

Conclusion. The toxicity of the bouillon culture of the Shiga type of dysenter bacillus is highest in the two-weeks culture.

Protocols on the Relation of the Cultivation Time and Toxin Production of Dysentery Bacillus.

Note : In the Tables, haemorrhage (H) and edema (E) are the pathological finding in the cœcum of rabbits specific to dysentery. (R) indicates the retention of urine.

Protocol A

Experiment I. With four-days culture.

Rabbit No.	Body weight in grams	No. of Strain	Amt. of Injection	Course	Death or Survival	Autopsy Findings
1001	1,570	No. 16	0.05	Diarrhœa and paralysis from 6th, death on 11th	Death	H and R
1002	2,000	»	»	Paralysis from 3rd, death on 4th	Death	E and R
1003	2,180	»	0.1	Paralysis from 3rd, diarrhœa from 4th, death on 5th day	Death	H and R
1004	1,650	»	»	Paralysis from 3rd, death on	Death	»
1005	1,740	No. 33	0.05		Survived	
1006	2,410	»	»	Death on the next day	Death	No change
1007	1,730	»	0.1		Survived	
1008	1,850	»	»	Diarrhœa and paralysis from 5th, death on 8th day	Death	H and R
1009	1,720	No. 10	0.05		Survived	
1010	1,770	»	»		»	
1011	1,880	»	0.1	Diarrhœa and paralysis from 3rd, death on 5th day	Death	H, E and R
1012	1,670	»	»	Death on 3rd day	Death	E
1013	1,680	No. 27	0.05	Death on 9th day	Death	No change
1014	1,860	»	»		Survived	
1015	1,985	»	0.1	Paralysis from 4th day, death on 6th day	Death	E and R
1016	1,580	»	»	Death on 10th day	Death	No change

Experiment II. With one-week culture.

Rabbit No.	Body weight in grams	No. of Strain	Amt. of Injection	Course	Death or Survival	Autopsy Findings
17	1,760	No. 16	0.025	Diarrhœa from the 4th, paralysis from 6th, death on 8th day	Death	H and R
18	2,150	»	»	Paralysis from 2nd, death on 3rd day	Death	E
19	1,780	»	0.05	Paralysis from 4th, diarrhœa from 6th, death on 8th day	Death	H and R
10	2,040	»	»	Death on 4th day	Death	E
11	1,670	»	0.1	Paralysis from 3rd, diarrhœa from 4th, death on 7th day	Death	H, E and R
12	1,770	»	»	Death on the next day	Death	No change
13	1,550	No. 33	0.025	Paralysis from 4th, death on 5th day	Death	H and R
14	1,360	»	»	Death on 3rd day	Death	No change
15	1,930	»	0.05	Paralysis from 3rd, death on 5th day	Death	E and R
16	1,630	»	»	Paralysis from 3rd, diarrhœa from 5th, death on 6th day	Death	H and R
17	1,650	»	0.1	Diarrhœa and paralysis from 4th, death on 10th day	Death	E
18	1,730	»	»	Paralysis on 4th day	Survived	
19	1,920	No. 10	0.025	Paralysis from 7th, death on 10th day	Death	H and R
10	1,930	»	»	Paralysis from 3rd, death on 4th day	Death	E
11	1,520	»	0.05		Survived	
12	1,650	»	»		Survived	
13	1,450	»	0.1	Paralysis and diarrhœa from 3rd, death on 4th day	Death	E
14	1,660	»	»	Paralysis from 8th, diarrhœa from 9th, death on 10th day	Death	H, E and R
15	1,560	No. 27	0.025		Survived	
16	1,920	»	»	Death on 5th day	Died	No change
17	1,560	»	0.05	Paralysis from 8th, death on 10th day	Died	E and R
18	1,680	»	»	Paralysis on 4th day	Survived	
19	1,430	»	0.1		Survived	
10	1,720	»	»	Death on 8th day	Died	No change

Experiment III. With two-weeks culture.

Rabbit No.	Body weight in grams	No. of Strain	Amt. of Injection	Course	Death or Survival	Autopsy Findings
1047	1,690	No. 16	0.01	Paralysis, diarrhœa, from 3rd, death on 4th day	Died	H and E
1048	1,830	»	»	Paralysis, diarrhœa from 3rd, death on 11th day	Died	No chang
1045	1,780	»	0.025	Paralysis from 3rd, diarrhœa from 5th to 7th day	Survived	
1046	1,820	»	0.025	Paralysis from 3rd, diarrhœa from 4th, death on 11th day	Died	No chang
1115	1,500	»	0.05	Death on 2nd day	Died	No chang
1116	1,500	»	»	Death on 2nd day	Died	H and R
1051	1,760	No. 33	0.01	Paralysis from 2nd, death on 3rd day	Died	H
1052	1,880	»	»	Paralysis from 7th to 9th day	Survived	
1049	1,660	»	0.025	Paralysis from 2nd day, death on 3rd day	Died	E and R
1050	1,430	»	»	Paralysis from 2nd to 9th day	Survived	
1117	1,630	»	0.05		Survived	
1118	1,580	»	»	Death on 4th day	Died	R
1055	1,910	No. 10	0.01		Survived	
1056	1,800	»	»		Survived	
1053	1,460	»	0.025	Paralysis from 3rd to 10th day	Survived	
1054	1,900	»	»		Survived	
1119	1,520	»	0.05	Paralysis from 3rd to 8th day	Survived	
1120	1,500	»	»	Paralysis and diarrhœa from 2nd, death on 6th day	Died	H and R
1057	1,860	No. 27	0.01		Survived	
1058	1,580	»	»	Diarrhœa and paralysis from 3rd to 9th, death on 14th day	Died	H
1059	1,730	»	0.025	Paralysis from 2nd, diarrhœa from 3rd, death on 7th day	Died	H and R
1060	1,920	»	»	Paralysis and diarrhœa from 3rd, death on 6th day	Died	H and R
1120	2,300	»	0.05	Diarrhœa and paralysis from 2nd, death on 6th day	Died	E and R
1122	1,750	»	0.05	Diarrhœa and paralysis from 3rd, death on 8th day	Died	H

Experiment IV. With three-weeks culture.

Rabbit No.	Body weight in grams	No. of Strain	Amt. of Injection	Course	Death or Survival	Autopsy Findings
177	2,050	No. 16	0.01	Diarrhœa and paralysis on 4th day	Survived	
178	1,650	»	»		Survived	
179	1,950	»	0.025	Paralysis from 2nd, death on 3rd day	Died	H (Pregnant)
180	1,750	»	»	Paralysis on 2nd day	Survived	
223	1,780	»	0.05	Paralysis on 6th day	Survived	
224	1,550	»	»	Death on 2nd day	Died	No change
80	1,850	No. 33	0.01		Survived	
82	1,900	»	0.01	Paralysis from 3rd to 10th day	Survived	
83	1,900	»	0.025	Paralysis and diarrhœa from 3rd, death on 10th day	Died	H and R
84	1,700	»	»	Diarrhœa on 5th day	Survived	
25	1,500	»	0.05	Paralysis from 3rd, death on 5th day	Died	R
26	1,530	»	»	Death on 3rd day	Died	R
85	1,950	No. 10	0.01	Diarrhœa and paralysis on the 4th day	Survived	
86	1,900	»	»	Diarrhœa on 5th day	Survived	
87	1,850	»	0.025		Survived	
88	1,900	»	»		Survived	
27	1,420	»	0.05	Paralysis and diarrhœa from 2nd, death on 7th day	Died	E and R
28	1,350	»	0.05	Diarrhœa and paralysis from 2nd, death on 3rd day	Died	H and R
89	1,650	No. 27	0.01		Survived	
90	1,550	»	»		Survived	
91	1,550	»	0.025	Diarrhœa from 4th to 8th, paralysis from 7th to 8th, death on 11th day	Died	H
92	1,800	»	»	Paralysis from 4th to 5th, death on 11th day	Died	H
129	1,400	»	0.05	Paralysis from 3rd to 4th day	Survived	
130	1,400	»	»	Paralysis from 3rd, death on 6th day	Died	H

Experiment V. With four-weeks culture.

Rabbit No.	Body weight in grams	No. of Strain	Amt. of Injection	Course	Death or Survival	Autopsy Findings
1099	1,500	No. 16	0.05	Death on the next day	Died	Pregnant
1100	1,620	»	»		Survived	
1101	1,600	No. 33	0.05	Death on 9th day	Died	H and E
1102	1,690	»	»	Death on 4th day	Died	H
1103	1,770	No. 10	0.05	Paralysis and diarrhœa from 4th, death on 8th day	Died	H and R
1104	1,680	»	»	Death on 4th day	Died	H and E
1105	1,580	No. 27	0.05		Survived	
1106	1,740	»	»	Death on the next day	Died	R

Experiment VI. With five-weeks culture.

1131	1,600	No. 16	0.05		Survived	
1132	1,580	»	»	Death on 8th day	Died	H and R
1133	1,720	No. 33	0.05		Survived	
1134	1,500	»	0.05		Survived	
1135	1,500	No. 10	0.05	Paralysis and diarrhœa from 2nd to 5th day	Survived	
1136	1,550	»	»	Paralysis from 2nd, diarrhœa from 3rd; death on 4th day	Died	E and R
1137	1,750	No. 27	0.05	Diarrhœa and paralysis from 2nd, death on 4th day	Died	H
1138	1,900	»	»	Diarrhœa and paralysis from 2nd, death on 4th day	Died	H

Experiment VII. With six-weeks culture.

1239	1,750	No. 16	0.05		Survived	
1240	1,750	»	»		»	
1241	1,900	No. 33	0.05		»	
1242	1,750	»	»		»	
1243	1,550	No. 10	0.05		»	
1244	1,550	»	0.05	Paralysis and diarrhœa from 3rd, death on 4th day	Died	H and R
1237	1,850	No. 27	0.05		Survived	
1238	1,900	»	»	Diarrhœa and paralysis from 6th to 8th day	Survived	

Experiment VIII. With one-week culture.

Rabbit No.	Body weight in grams	No. of Strain	Amt. of Injection	Course	Death or Survival	Autopsy Findings
107	1,500	No. 25	0.05	Paralysis from 3rd to 4th day	Survived	
108	1,500	»	»		»	
109	1,540	No. 15	0.05	Paralysis on 4th day	Survived	
110	1,610	»	»			
111	1,660	No. 12	0.05	Diarrhœa and paralysis from 4th, death on 7th day	Died	H and E
112	1,650	»	»	Death on the next day	Died	Pregnant
113	2,140	No. 17	0.05	Death on 2nd day	Died	H
114	1,560	»	»	Paralysis and diarrhœa from 4th to 7th day	Survived	

Experiment IX. With two-weeks culture.

139	1,690	No. 25	0.05	Death on 2nd day	Died	R
140	1,640	»	»	Paralysis and diarrhœa from 3rd, death on 5th day	Died	H, E and R
141	1,500	No. 12	0.05	Paralysis on 3rd day	Survived	
142	1,830	»	»	Diarrhœa and paralysis on 5th day	»	
143	1,480	No. 15	0.05	Paralysis from 2nd, diarrhœa from 3rd, death on 7th day	Died	H
144	1,430	»	»	Death on 3rd day	»	H
145	1,655	No. 17	0.05	Death on 2nd day	»	No change
146	1,470	»	»	Diarrhœa from 3rd, paralysis from 7th, death on 9th day	»	H and R

Experiment X. With three-weeks culture.

53	1,850	No. 21	0.05	Paralysis and diarrhœa from 4th to 5th day	Survived	
56	1,750	»	»		»	
55	1,500	No. 11	0.05	Diarrhœa and paralysis from 2nd, death on 3rd day	Died	H and R
56	1,750	»	»	Death on 3rd day	Died	R
57	1,850	No. 12	0.05		Survived	
58	1,690	»	»	Death on 8th day	Died	R
59	1,690	No. 17	0.05		Survived	
60	1,790	»	»	Paralysis and diarrhœa from 4th, death on 7th day	Died	R

B. THE RELATION OF DYSENTERY TOXIN PRODUCTION AND KINDS OF PEPTONES USED IN THE MEDIA

There are many varieties of peptones on the market used in preparation of cultur media. This experiment was undertaken in order to determine which peptone is bes suited for dysentery toxin production. The following peptones were used :

1. Teruuch'is peptone.
2. Witte's peptone.
3. Riba peptone (prepared from fish meat).
4. Serum albumin peptone (prepared from digested horse serum).
5. Fibrin peptone (prepared from horse blood fibrin digested with trypsin).
6. Serum globulin peptone (prepared from digested horse serum).
7. Legumin peptone (prepared from legumin of beans digested with trypsin).
8. Chapoteaut's peptone.

The above peptones were added to bouillon in the proportion of 1% and mad alkaline. In a one-litre flask, 500 cc. of the medium was placed and the organism plan ted. After the required incubation period, the culture was filtered through a Berke feld filter and preserved with toluol. (The Science Conference of the League of Nations November 1922, adopted an alkalinity of PH. 7.4, but we used PH. 8.0.)

The amount of the bouillon for injection was calculated per kilogram of the bod weight of rabbit, and injected intravenously.

1. The results of the experiments with Teruuchi's peptone incubated at 37° C. ar already mentioned in Section A. Therefore in this section we experimented wit cultures incubated at a low temperature (32°). The results were about the same as i the previous experiments. Two-week incubation produced the strongest toxicity. (Ex periments I, II and III.)

2. With Witte's peptone-bouillon culture, the injection of 0.05 cc. per kilogram c body weight of the animal of toxin of a two-weeks incubation culture at 37° C. cause death of three rabbits out of four with typical pathological changes; one had typic symptoms but survived. The culture incubated at a low temperature (32°) did not pr duce strong toxin in comparison with Teruuchi's peptone media even after three week incubation. (Experiments IV, V and VI.)

3. Riba peptone-bouillon culture did not produce strong toxin. (Experiments VI and VIII.)

4. Serum albumin-bouillon culture produced rather strong toxin with one to tw weeks' incubation. (Experiments IX, X and XI.)

5. The toxin production with serum globulin-bouillon culture was unsatisfactory (en after two weeks' incubation. (Experiments XII, XIII and XIV.)

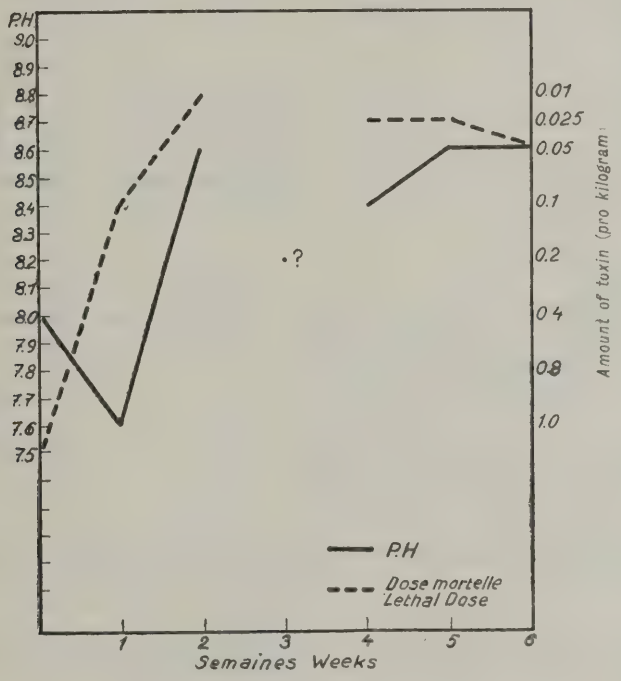
6. Fibrin peptone-bouillon culture produced rather strong toxin throughout one, t o and three weeks' incubations. (Experiments XV, XVI and XVII.)

7. Legumin peptone-bouillon culture produced rather strong toxin in one week but (creased in two weeks' incubation. (Experiments XVIII, XIX and XX.)

8. Chapoteaut's peptone-bouillon culture showed strong toxin production with two eks' incubation. It showed better toxin production in comparison with the other ptones.

The minimum lethal dose and changes of alkalinity of the media are shown gra- ically in the following table. (Experiments XXI, XXII, XXIII, XXIV, XXV and XVI.)

TABLE I



The results of the foregoing experiments show that Teruuchi's and fibrin peptones re somewhat superior to the other peptones. *Chapoteaut's peptone, however, gave the est results*, but on account of shortage of the material we were not able to repeat the xperiment to ensure the result.

Protocols on the Relation of Dysentery Toxin Production and Kinds of Peptones used in the Media.

Protocol B

Experiment I. Ten-days culture at 32° C. With Teruuchi's Casein Peptone.

Rabbit No.	Body weight in grams	No. of Strain	Amt. of Injection	Course	Death or Survival	Autopsy Findings
1297	1,740	No. 16	0.025	Paralysis and diarrhœa from 7th to 9th day	Survived	
1298	1,660	»	»	Death on next day	Died	No change
1299	1,540	»	0.05		Survived	
1300	1,620	»	»		Survived	
1301	1,870	»	0.1	Death on next day	Died	No change
1302	1,700	»	»	Paralysis and diarrhœa from 3rd, death on 10th day	Died	H and R

Experiment II. Two-weeks culture at 32° C. With Teruuchi's Casein Peptone.

1307	1,860	No. 16	0.05		Survived	
1308	1,750	»	»		Survived	

Experiment III. Three-weeks culture at 32° C. With Teruuchi's Casein Peptone.

1350	1,500	No. 16	0.05	Paralysis on 4th and 5th day	Survived	
1351	1,850	»	»	Death on next day	Died	Congestion
1352	1,800	»	0.1	Paralysis and diarrhœa from 2nd, death on 3rd day	Died	Congestion
1353	1,650	»	»	Paralysis from 4th, death on 6th day	Died	R

Experiment IV. Two-weeks culture at 37° C. With Witte's Peptone.

Rabbit No.	Body weight in grams	No. of Strain	Amt. of Injection	Course	Death or Survival	Autopsy Findings
24	1,550	No. 16	0.05	Death on 3rd day	Died	E
25	1,900	»	»	Death on 3rd day	Died	E
28	1,580	No. 33	0.05	Paralysis from the next day, death on 2nd day	Died	R and congestion
29	1,700	»	»	Diarrhœa and paralysis from 3rd to 5th day	Survived	

Experiment V. Ten-days culture at 32° C. With Witte's Peptone.

33	1,690	No. 16	0.05		Survived	
34	1,620	»	»		Survived	
35	1,550	No. 33 s. f.	0.05		Survived	
36	1,530	»	»		Survived	

Experiment VI. Three-weeks culture at 32° C. With Witte's Peptone.

32	1,700	No. 16	0.05		Survived	
33	1,750	»	»		Survived	
34	1,650	»	0.01	Death on next day	Died	Congestion
35	1,800	»	»	Paralysis and diarrhœa from 2nd day, death on 3rd day	Died	Congestion
36	1,900	No. 33	0.05	Paralysis on 4th day	Survived	
37	1,700	»	»	Death on the next day	Died	Congestion
38	1,600	»	0.1		Survived	
39	1,700	»	»		Survived	

Experiment VII. One-week culture at 37° C. With Riba Peptone.

23	1,850	No. 16	0.05		Survived	
24	1,650	»	»		Survived	
25	1,750	No. 33	0.05	Paralysis and diarrhœa from 7th, death on 10th day	Died	H
26	1,800	»	»		Survived	

Experiment VIII. Two-weeks culture at 37° C. With Riba Peptone.

Rabbit No.	Body weight in grams	No. of Strain	Amt. of Injection	Course	Death or Survival	Autop. Findi
1286	1,850	No. 16	0.05	Death on 2nd day	Died	E and
1287	1,900	»	»	Death on 2nd day	Died	Pregn
1288	1,880	No. 33	0.05	Death on 2nd day	Died	Pregn

Experiment IX. One-week culture at 37° C. Serum albumin-bouillon media.

1458	1,840	No. 16	0.01		Survived	
1459	1,990	»	»		Survived	
1460	1,850	»	0.025	Paralysis and diarrhœa from 5th to 6th day	Survived	
1461	1,910	»	»	Death on 5th day	Died	H and
1462	1,710	»	0,05	Paralysis and diarrhœa from 3rd to 5th day	Survived	
1463	1,760	»	»	Death on 3rd day	Died	H, E a
1452	1,600	»	»	Paralysis from 2nd, diarrhœa from 3rd, death on 5th day	Died	H and
1453	1,900	»	»	Diarrhœa from 4th, paralysis from 2nd, death on 5th day	Died	H and
1454	1,760	»	0.1	Paralysis from 2nd, death on 3rd day	Died	E
1455	1,600	»	»	Death on 2nd day	Died	No ch
1456	1,550	»	0.2	Paralysis from 2nd, diarrhœa from 4th to 10th day	Survived	
1457	1,630	»	»	Paralysis from 2nd, diarrhœa from 4th, death on 10th day	Died	H and
1491	1,860	No. 33	0.05		Survived	
1492	1,960	»	0.01	Paralysis and diarrhœa from 2nd, death on 3rd day	Died	H and

Experiment X. With two-weeks culture at 37° C.

1508	1,610	No. 16	0.01		Survived	
1509	1,540	»	0.025	Death on 4th day	Died	H, E a
1510	1,530	No. 16	0.05	Paralysis and diarrhœa from 4th, death on 6th day	Died	H and
1517	1,630	No. 33	0.01		Survived	
1518	1,570	»	0.025		Survived	
1519	1,520	»	0.05	Death on 3rd day	Died	No ch

Experiment XI. With three-weeks culture at 37° C.

Rabbit No.	Body weight in grams	No. of Strain	Amt. of Injection	Course	Death or Survival	Autopsy Findings
16	1,970	No. 16	0.01		Survived	
17	1,740	»	0.05	Paralysis and diarrhœa from 5th to 8th day	Survived	
13	1,550	»	»	Paralysis and diarrhœa from 3rd, death on 6th day	Died	R
18	1,630	No. 33	0.01	Paralysis and diarrhœa from 4th, death on 6th day	Died	H, E and R
19	1,570	»	0.05	Paralysis and diarrhœa from 4th, death on 5th day	Died	H and E
37	1,660	»	0.05	Diarrhœa and paralysis from 3rd, death on 4th day	Died	E and R

Experiment XII. With one-week culture at 37° C. Serum globulin-bouillon culture.

45	1,670	No. 16	0.05		Survived	
46	1,780	»	»		Survived	
47	1,900	»	0.1	Death on 3rd day	Died	H and R
48	1,800	»	»	Death on 2nd day	Died	No change
49	1,700	»	0.2	Death on 7th day	Died	E
50	1,590	»	»	Paralysis from 2nd, death on 4th day	Died	R
51	1,560	No. 33	0.05	Paralysis and diarrhœa from 2nd, death on 3rd day	Died	E
52	1,630	»	0.1	Diarrhœa and paralysis from 2nd to 6th day	Survived	

Experiment XIII. With two-weeks culture at 37° C.

53	1,500	No. 16	0.01	Death on 3rd day	Died	H
54	1,670	»	0.025		Survived	
55	1,730	»	0.05	Death on the next day	Died	No change
56	1,730	No. 33	0.01		Survived	
57	1,720	»	0.025		Survived	
58	1,500	»	0.05	Diarrhœa and paralysis from 2nd, death on 3rd day	Died	H

Experiment XIV. With three-weeks culture at 37° C.

Rabbit No.	Body weight in grams	No. of Strain	Amt. of Injection	Course	Death or Survival	Autops Findin
1534	1,840	No. 16	0.05	Death on 2nd day	Died	H and
1538	1,950	No. 33	0.05	Death on 4th day	Died	No cha

Experiment XV. With one-week culture at 37° C. Fibrin peptone-bouillon cultur

1481	1,930	No. 16	0.05	Paralysis from 2nd, death on 3rd day	Died	R
1482	1,950	»	»	Paralysis and diarrhœa from 2nd, death on 4th day	Died	H, E an
1483	1,820	»	0.1	Death on 5th day	Died	E
1484	1,580	»	»	Death on 3rd day	Died	R
1480	1,880	»	0.2	Death on the next day	Died	No cha
1486	1,840	»	»	Paralysis from 2nd, death on 3rd day	Died	No cha
1487	1,680	No. 33	0.05	Death on 4th day	Died	No cha
1488	1,930	»	0.1	Diarrhœa and paralysis from 3rd, death on 5th day	Died	H, E an

Experiment XVI. With two-weeks culture at 37° C.

1520	1,780	No. 16	0.01		Survived	
1521	1,780	»	0.025	Paralysis and diarrhœa from 3rd, death on 7th day	Died	H
1522	1,610	»	0.05	Death on 3rd day	Died	H and
1523	1,570	No. 33	0.01	Paralysis and diarrhœa from 3rd, death on 6th day	Died	H and
1524	1,650	»	0.025	Paralysis and diarrhœa from 3rd, death on 4th day	Died	H and
1525	1,880	»	0.05	Paralysis and diarrhœa from 3rd, death on 6th day	Died	H and

Experiment XVII. With three-weeks culture at 37° C.

Rabbit No.	Body weight in grams	No. of Strain	Amt. of Injection	Course	Death or Survival	Autopsy Findings
——	——	——	——	——	——	——
62	1,750	No. 16	0.01	Paralysis and diarrhœa from 4th, death on 5th day	Died	H, E and R
63	1,850	»	0.05	Death on 4th day	Died	H and E
52	1,810	»	»	Paralysis and diarrhœa from 3rd, death on 4th day	Died	H and R
64	1,600	No. 33	0.01		Survived	
65	1,700	»	0.05	Paralysis and diarrhœa from 4th, death on 5th day	Died	H and R

Experiment XVIII. With one-week culture at 37° C. Legumin Peptone-Bouillon Culture.

41	1,580	No. 16	0.01		Survived	
4	1,790	»	»		Survived	
4	1,610	»	0.025		Survived	
4	1,690	»	0.05	Death on 3rd day	Died	H, E and R
4	1,940	»	»	Paralysis and diarrhœa from 3rd to 6th day	Survived	
4	1,740	»	»	Paralysis and diarrhœa from 3rd to 6th day	Survived	
4	1,900	»	»	Paralysis and diarrhœa from 3rd, death on 6th day	Died	H, E and R
4	1,650	»	0.1	Diarrhœa and paralysis from 3rd, death on 6th day	Died	E and R
4	1,790	»	»	Death on 3rd day	Died	No change
4	1,870	»	0.2	Paralysis from 2nd, death on 5th day	Died	E, H and R
4	1,780	»	»	Paralysis from 2nd, diarrhœa from 3rd, death on 5th day	Died	H
5	1,810	No. 33	0.05		Survived	
5	1,560	»	0.1	Paralysis and diarrhœa from 3rd, death on 5th day	Died	H and E

Experiment XIX. With two-weeks culture at 37° C.

50	1,720	No. 16	0.01		Survived	
50	1,780	»	0.025		Survived	
50	1,640	»	0.05		Survived	
50	1,900	No. 33	0.01	Death on 4th day	Died	R
50	1,690	»	0.025	Diarrhœa and paralysis from 4th, death on 6th day	Died	H and R
50	1,600	»	0.05		Survived	

Experiment XX. With three-weeks culture at 37° C.

Rabbit No.	Body weight in grams	No. of Strain	Amt. of Injection	Course	Death or Survival	Autop Findi
1660	1,560	No. 16	0.1		Survived	
1661	1,820	»	0.05	Diarrhœa and paralysis from 4th, death on 12th day	Died	H
1635	1,930	»	»	Paralysis and diarrhœa from 3rd, death on 9th day	Died	H and
1644	1,950	No. 33	0.01		Survived	
1645	1,520	»	0.05		Survived	

Experiment XXI. With one-week culture at 37° C. Chapoteaut's Peptone-Bouillon Culture.

The degree of alkalinity P. H. 7.6.

3064	1,910	No. 33	0.01		Survived	
3065	1,550	»	0.05		Survived	
3066	1,650	»	»		Survived	
3067	1,510	»	»	Paralysis from 3rd, death on 7th day	Died	H, E ar
3068	1,620	»	0.1	Diarrhœa from 2nd, death on 3rd day	Died	H, E ar
3069	1,600	»	»	Paralysis from 4th, death on 5th day	Died	H and
3070	1,800	»	»	Death on 3rd day	Died	E

Experiment XXII. With two-weeks culture at 37° C.

The degree of alkalinity P. H. 8.6.

3097	1,580	No. 33	0.005	Paralysis from 6th, death on 8th day	Died	R
3096	1,720	»	0.01	Paralysis from 3rd, diarrhœa from 5th, death on 8th day	Died	H, E ar
3095	1,600	»	»	Paralysis from 2nd, death on 9th day	Died	R
3094	1,670	»	0.025	Paralysis from 3rd, diarrhœa from 7th, death on 9th day	Died	H and
3093	1,880	»	»	Diarrhœa and paralysis from next day, death on 3rd day	Died	H, E ar
3087	1,800	»	0.05	Death on 2nd day	Died	E and
3088	1,820	»	»	Death on 2nd day	Died	E and
3089	1,930	»	0.2	Diarrhœa and paralysis from 2nd, death on 3rd day	Died	H and

Experiment XXIII. With three-weeks culture at 37° C.

P. H. 8.2.

Rabbit No.	Body weight in grams	No. of Strain	Amt. of Injection	Course	Death or Survival	Autopsy Findings
0	1,820	No. 33	0.05		Survived	
1	1,560	»	»		Survived	
2	1,630	»	0.1		Survived	
3	1,980	»	0.2	Death on 2nd day	Died	No change
5	1,610	»	»	Death on 3rd day	Died	E and R

Experiment XXIV. With four-weeks culture at 37° C.

The degree of alkalinity P. H. 8.4.

8	1,700	No. 33	0.01	Paralysis from 3rd to 5th day	Survived	
7	1,600	»	0.025	Diarrhœa and paralysis from 4th, death on 6th day	Died	H and E
6	1,800	»	0.05	Paralysis from 3rd, death on 6th day	Died	No change
10	1,540	»	»	Paralysis from 2nd, death on 3rd day	Died	No change
11	1,540	»	0.1	Death on the next day	Died	No change
12	1,510	»	0.2	Paralysis from 2nd, death on 3rd day	Died	No change
13	1,530	»	»	Paralysis from the next, death on 3rd day	Died	E and R

Experiment XXV. With five-weeks culture at 37° C.

P. H. 8.6.

15	1,600	No. 33	0.01		Survived	
14	1,820	»	0.025	Paralysis from 2nd, death on 3rd day	Died	No change
18	1,820	»	0.05	Death on 2nd day	Died	No change
19	1,660	»	0.1	Death on the next day	Died	E
10	1,770	»	0.2	Death on the next day	Died	E

Experiment XXVI. With six-weeks culture at 37° C.

The degree of alkalinity P. H. 8.6.

16	1,920	No. 33	0.01		Survived	
17	1,710	»	0.025	Death on 8th day	Died	No change
18	1,550	»	0.05	Diarrhœa and paralysis from 3rd, death on 4th day	Died	H, E and R
19	1,550	»	0.1	Death on 8th day	Died	H and E
10	1,800	»	0.2	Diarrhœa and paralysis from 3rd, death on 6th day	Died	H, E and R

C. INFLUENCE OF THE REACTION OF THE CULTURE MEDIA ON TOXIN PRODUCTION

It is a well-known fact that the reaction of the culture media has a marked influe on toxin production of bacteria. But each investigator has found different results, wh might have been due to the fact that the means to express the reaction or the H- concentration were unsatisfactory. The recent discovery of the indicator method determine the hydrogen ion concentration makes an accurate test of the reaction co paratively easy. In our experiments bouillon medium with 1 % peptone and 0.5 salt was made to have different reactions with NaOH or HCl and their influences on toxin production by the organism were examined.

The media having different reactions were placed in amounts of 20 cc. in la test tubes and sterilised. Then the dysentery organism was planted. One tube fr each group of the media having different reactions was taken out after certain peri of incubation and the organism was killed by adding carbolic acid to the extent of 0.5 A certain amount of these samples was intravenously injected for comparison of toxicity.

The media used in this experiment had the following reactions before the plant of the organisms, PH 8.7, 8.4, 8.0, 7.6, 7.2 and 6.9.

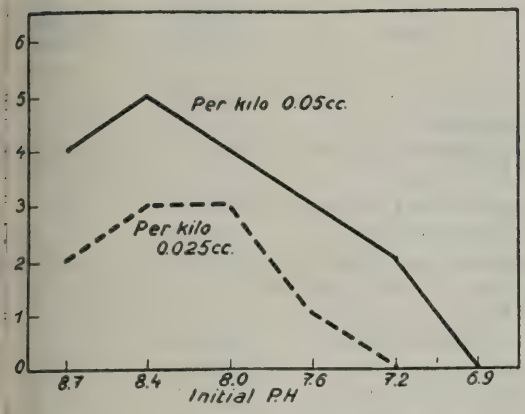
The results of the experiment may be shown graphically in the following table.

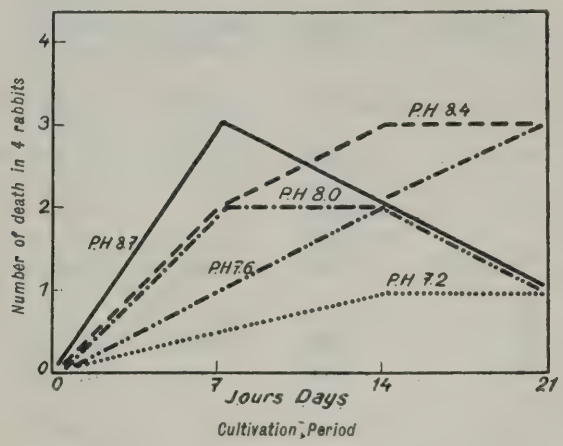
NOTE. + indicates the death of the animal. The smaller number beside + in cates the number of days before death. O indicates survival of the animal. The amou of the injection is calculated per kilogram of the body weight of rabbits.

INITIAL P. H.	CULTIVATION PERIOD						DEATH RAT
	1 week		2 weeks		3 weeks		
	Dose per kilo 0.025	0.05	Dose per kilo 0.025	0.05	Dose per kilo 0.025	0.05	
8.7	O	+16	O	O	O	+14	6/12
	+15	+16	+18	+14	O	O	
8.4	O	+15	O	+12	+17	+13	8/12
	O	+14	+13	+11	+12	O	
8.0	+13	O	+17	+12	O	+13	7/12
	O	+15	O	O	+14	+14	
7.6	O	+11	O	+14	O	+13	4/12
	O	O	+16	O	O	O	
7.2	O	O	O	O		+14	2/10
	O	O	O	+11		O	
6.9	O	O	O	O			0/8
	O	O	O	O			

TABLES I AND II

The curve represents the statistic of the death throughout three experiments





According to these experiments the media which had PH 8.0 to 8.4 caused the highest death-rate of animals, while those having less than PH 7.2 did not produce strong toxin on incubation of one to two weeks.

In strong alkaline media toxin is produced more quickly than in weak alkaline media. To attain a certain strength of toxin with weak alkaline media the incubation period must be prolonged. When the alkalinity is too strong the toxin production reaches a certain point quickly and decreases rapidly.

Conclusion : The optimum alkalinity of bouillon media is PH 8.0 to 8.4, and the incubation period is from two to three weeks. When the alkalinity is weaker than the above, the incubation period must be prolonged to obtain a certain strength of toxin.

Protocols on the Influence of the Reaction of the Culture Media on Toxin Production.

The bouillon media having PH 8.7, 8.4, 8.0, 7.6, 7.2 and 6.9 before incubation were incubated for required periods; carbolic acid was then added to the extent of 0.5 %. The strength of toxin was tested by intravenous injection in amounts of 0.05 to 0.025 cc. per kilogram of body weight of rabbits. The results are as follows.

NOTE : PH in the table indicates the alkalinity of the bouillon before incubation. (H) Hæmorrhage and (E) Oedema are the pathological findings in the cœca of rabbits, specific alterations due to dysentery. (R) indicates the retention of urine.

Protocol C.

Experiment I. One-week Culture.

Rabbit No.	Body weight in grams	Reaction of medium	Amt. of Injection	Course	Death or Survival	Autopsy Findings
89.	1,740	P. H. 8.7	0.025	Remained free from symptoms	Survived	
90.	1,720	»	0.025	Paralysis from 4th, death on 9th day	Died	No change
91.	1,640	»	0.05	Paralysis from 4th, death on 6th day	Died	H
92.	1,770	»	0.05	Paralysis and diarrhœa from 4th, death on 6th day	Died	E and R
93.	1,620	P. H. 8.4	0.025	Free from symptoms	Survived	
94.	1,650	»	0.025	Slight paralysis from 4th day, recovered	Survived	
95.	1,720	»	0.05	Paralysis and diarrhœa from 3rd, death on 5th day	Died	E and R
96.	1,570	»	0.05	Paralysis from 3rd, death on 4th day	Died	H and R
97.	1,880	P. H. 8.0	0.025	Paralysis and diarrhœa from 3rd, death on 4th day	Died	Pregnant
98.	1,400	»	0.025	Slight paralysis from 4th, recovery after the 7th day	Survived	
99.	1,280	»	0.05	Slight paralysis from 4th, recovery after 7 days	Survived	
100.	2,280	P. H. 8.0	0.05	Paralysis and diarrhœa from 3rd, death on 5th day	Died	H and R
101.	1,840	P. H. 7.6	0.025	Free from symptoms	Survived	
102.	1,640	»	0.025	Do.	Survived	
103.	1,260	»	0.05	Death in 10 hours after injection	Died	No change
104.	1,660	»	0.05	Free from symptoms	Survived	
105.	1,670	P. H. 7.2	0.025	Do.	Survived	
106.	1,620	»	0.025	Do.	Survived	
107.	1,720	»	0.05	Do.	Survived	
108.	1,280	»	0.05	Do.	Survived	
109.	1,750	P. H. 6.9	0.025	Do.	Survived	
110.	1,590	»	0.025	Do.	Survived	
111.	1,620	»	0.05	Do.	Survived	
112.	1,250	»	0.05	Do.	Survived	

Experiment II. Two-weeks Culture.

Rabbit No.	Body weight in grams	Reaction of medium	Amt. of Injection	Course	Death or Survival	Autopsy Findings
113.	1,530	P. H. 8.7	0.025	Remained free from symptoms	Survived	
114.	1,730	»	0.025	Paralysis and diarrhœa from 3rd, death on 8th day	Died	H and R
115.	1,900	»	0.05	Paralysis in 4 days, recovery after 6 days	Survived	
116.	1,720	»	0.05	Paralysis and diarrhœa from 3rd, death on 4th day	Died	H and R
117.	1,680	P. H. 8.4	0.025	Free from symptoms	Survived	
118.	1,380	»	0.025	Paralysis from 2nd, death on 3rd day	Died	E and R
119.	1,730	»	0.05	Paralysis on the next day, death in 2 days	Died	No change
120.	1,500	»	0.05	Death in 18 hours	Died	H
121.	1,620	P. H. 8.0	0.025	Paralysis from 2nd; diarrhœa from 4th, death on 7th day	Died	H and E
122.	1,450	»	0.025	Slight paralysis from 3rd day, recovered after 5 days	Survived	
123.	1,800	P. H. 8.0	0.05	Paralysis from 2nd, death on 7th day	Died	H and R
124.	1,350	»	0.05	Paralysis from 2nd, recovery from 6th day	Survived	
125.	1,560	P. H. 7.6	0.025	Free from symptoms	Survived	
126.	1,650	»	0.025	Paralysis from 4th, death on 6th day	Died	H and R
127.	1,670	»	0.05	Paralysis from the next day; diarrhœa from 3rd, death on 4th day	Died	R, cæcal congestion
128.	1,500	»	0.05	Slight paralysis from 3rd day, recovery after 5 days	Survived	
129.	1,550	P. H. 7.2	0.025	Remained free from symptoms	Survived	
130.	1,980	»	0.025	Do.	Survived	
131.	1,670	»	0.05	Do.	Survived	
132.	1,740	»	0.05	Death on next day	Died	Cæcal congestion; pregnant
133.	1,830	P. H. 6.9	0.025	Free from symptoms	Survived	
134.	1,800	»	0.025	Do.	Survived	
135.	1,520	P. H. 6.9	0.05	Remained free from symptoms	Survived	
136.	1,380	»	0.05	Do.	Survived	

Experiment III. Three-weeks Culture.

Rabbit No.	Body weight in grams	Reaction of medium	Amt. of Injection	Course	Death or Survival	Autopsy Findings
137.	1,350	P. H. 8.7	0.025	Remained free from symptoms	Survived	
138.	1,550	»	0.025	Do.	Survived	
139.	1,300	»	0.05	Dead after 4 days	Died	
140.	1,450	»	0.05	Free from symptoms	Survived	
141.	1,550	P. H. 8.4	0.025	Diarrhœa from 6th, death on 7th day	Died	H
142.	2,000	»	0.025	Death on 2nd day	Died	E and R
143.	1,880	»	0.05	Paralysis and diarrhœa from 2nd; death on 3rd day	Died	E and R
144.	1,970	»	0.05	Free from symptoms	Survived	
145.	1,450	P. H. 8.0	0.025	Paralysis from 3rd, recovery after 7 days	Survived	
146.	1,980	»	0.025	Paralysis from 3rd, death on 7th day	Died	H, E and R
147.	1,630	»	0.05	Paralysis and diarrhœa from 2nd, death on 3rd day	Died	H and E
148.	1,450	»	0.05	Paralysis from 2nd, death on 4th day	Died	E and R
149.	1,780	P. H. 7.6	0.025	Free from symptoms	Survived	
150.	1,500	»	0.025	Do.	Survived	
151.	1,680	»	0.05	Paralysis from 2nd, death on 3rd day	Died	E and R
152.	1,750	»	0.05	Slight paralysis after 3 days, recovered	Survived	
153.	1,700	P. H. 7.2	0.05	Free from symptoms	Survived	
154.	1,650	»	0.05	Death on 4th day	Died	H

D. Addenda.

1. Alteration of PH in the Dysentery Bouillon Culture.

The preceding experiments indicate that there is a certain relation between PH of the culture media and the toxin production. An explanation of this relation requires much study. As a first step, we studied the alteration of PH of the media by the growth of the organisms. It is known that acidity increases at first and then alkalinity is increased. But we systematically studied the changes in detail.

Methods of experiment : Bouillon media having different PH were prepared and divided into test tubes and sterilised. Then PH of the media was accurately determined before planting of the organism and incubated. From time to time samples were removed and PH was determined.

2. The Alteration of PH of the Media by Growth of the Organism.

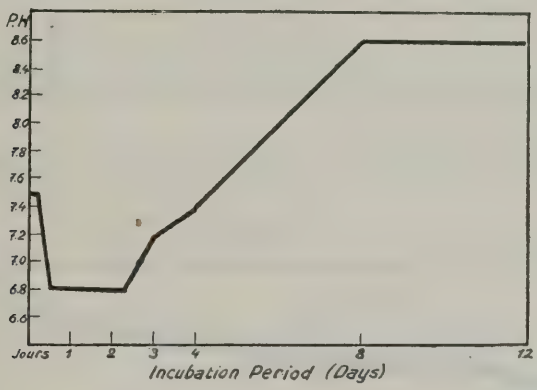
Ten cc. of bouillon medium were placed in test tubes of the same calibres and sterilised. After incubation overnight to obtain complete sterilisation, PH of each tube was determined. Then a drop of twenty-four-hours-culture was placed in each tube and incubated. After certain periods of time, samples were removed and PH was determined. The results were as follows :

Time	before	1 hr.	2 hrs.	3 hrs.	4 hrs.	5 hrs.	6 hrs.	7 hrs.	9 hrs.	1 day	2 days
PH	7.5	7.5	7.4	7.2	7.0	6.8	6.8	6.8	6.8	6.8	6.8

3 days	4 days	8 days	12 days
7.2	7.4	8.6	8.6

Notes : The PH in the table is the average of three tubes. As a matter of fact, the differences of PH in each tube were less than 0.1 and the changes were uniformly the same. The above changes of PH may be represented in a curve.

Curve I.



Thus in a few hours acid is produced and reaches a maximum in 6 to 7 hours and remains at this level for 1 to 2 days. Then alkalinity is increased and reaches a maximum alkalinity, where it remains for a certain number of days.

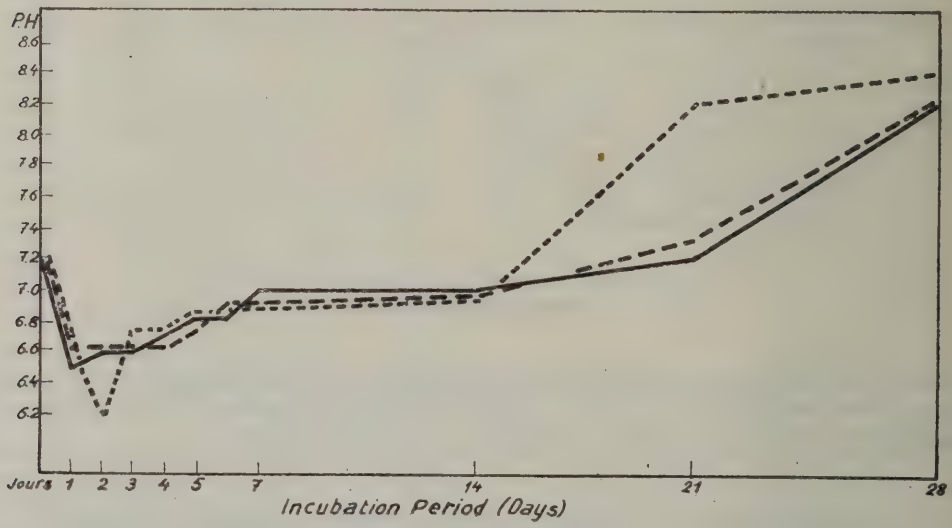
3. The Differences of Changes of PH of Media by Various Strains.

Twenty cc. of bouillon were placed in large test tubes of diameter 2.5 cm. and sterilised. Having determined the PH of several test tubes, strains Nos. 5, 16 and 38 were inoculated and incubated. From time to time samples were removed and PH was determined. The results were as follows.

INCUBATION PERIOD	STRAIN NO. 5. Initial PH 7.2	16. Initial PH 7.2	38. Initial PH 7.2
1 day	6.6	6.5	6.6
2 days	6.6	6.6	6.2
3 —	6.6	6.6	6.7
4 —	6.6	6.7	6.7
5 —	6.7	6.8	6.8
6 —	6.9	6.8	6.8
7 —	6.9	7.0	6.9
14 —	7.1	7.1	7.1
21 —	7.4	7.3	8.2
28 —	8.2	8.2	8.4

The foregoing results may be represented in a curve (Curve II). As will be seen in the curve, all three different strains had about the same course. The media had about the same strength of H-ion concentration, PH 6.6 to 6.2. Then they gradually became alkaline, and in two or three weeks they had PH of the initial strength. The

CURVE II.



alkalinity continued to increase for three to four weeks, reaching as high as PH 8.0 or over. Strain No. 33 became alkaline quicker than the others and reached PH 8.0 in three weeks and 8.4 in four weeks.

According to the foregoing experiments, different strains take about the same course, with slight variations.

4. How the PH of Media before Incubation influences the Alteration of PH during the Incubation.

The media of different PH before inoculation of the organism were treated in the same way and the alteration of PH was determined during the growth of the organism. The media were inoculated with strain No. 33.

Experiment I.

The media had 2 % Teruuchi's casein peptone, and PH of 8.3, 7.9, 7.4 and 7.0.

Experiment I

INCUBATION PERIOD	INITIAL PH			
	8.3	7.9	7.4	7.0
1 day	7.2	7.0	7.0	6.6
2 days	7.2	7.0	7.1	6.6
3 —	7.4	7.0	7.2	6.7
5 —	7.8	7.0	7.4	6.7
7 —	8.6	8.1	8.2	6.7
10 —	8.6	7.4	8.6	6.7
14 —	8.6	8.5	8.6	6.7
21 —	8.6	8.6	8.6	7.2
28 —	8.6	8.6	8.6	8.6

Experiment II.

The media had 1 % Teruuchi's casein peptone, and PH of 8.6, 8.4, 8.0, 7.9 and 7.4.

Experiment II.

INCUBATION PERIOD	INITIAL PH				
	8.6	8.4	8.0	7.9	7.4
1 day	7.6	7.1	6.8	6.9	6.6
2 days	7.5	7.2	6.8	6.9	6.7
3 —	7.6	7.4	7.0	7.0	6.9
5 —	7.8	8.0	7.1	7.1	7.0
7 —	7.9	8.2	7.4	7.7	7.3
10 —	8.3	8.5	1.0	8.4	7.6
14 —	8.6	8.6	8.6	8.6	8.4
21 —	8.6	8.6	8.6	8.6	8.5
28 —	8.6	8.6	8.6	8.6	8.6

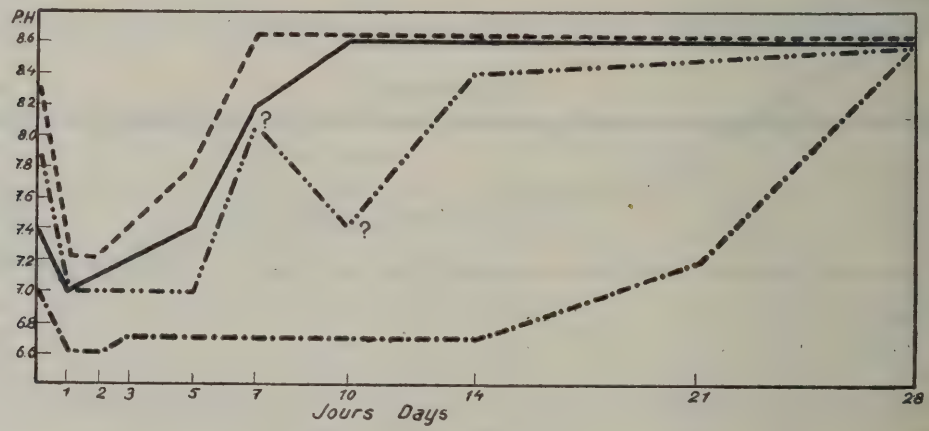
Experiment III.

The media had 1 % Teruuchi's casein peptone and PH of 8.7, 7.6, 5.2 and 4.4.

Experiment III.

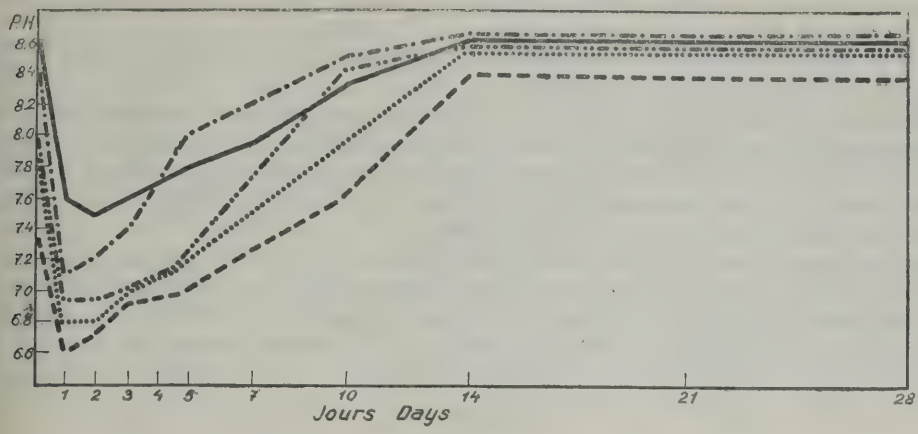
INCUBATION PERIOD	INITIAL PH			
	8.7	7.6	5.2	4.4
1 day	8.4	7.0	5.1	4.8
2 days	8.4	7.1	5.1	4.6
3 —	8.4	7.2	5.1	4.8
5 —	8.3	7.2	6.6	4.8
7 —	8.3	7.5	6.7	5.9
14 —	8.3	8.3	7.2	6.0
21 —	8.4	8.6	8.0	6.6
28 —	8.6	8.6	8.4	6.6

The foregoing results may be represented in curves III (*a-b-c*). The media havin PH of 7.0 to 8.6 had uniformly marked acid production on the first and second day but the alkalinity increased gradually. When the initial alkalinity is strong the increas

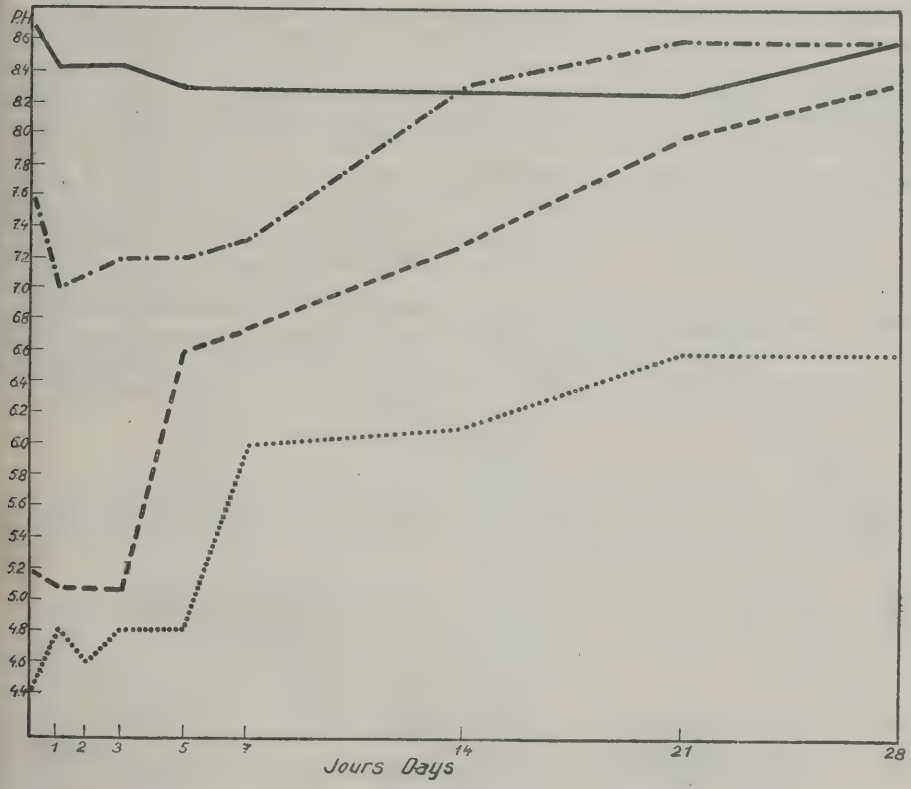


of alkalinity is also rapid. On the other hand, when the initial alkalinity is weak th recovery is also slow. But within a certain limit of the reactions (PH 8.6 to 7.0), i spite of differences in the initial reactions, it reaches a certain maximum alkalinity an remains there for a long time. Our experiments showed that no strains produced alka linity of over PH 8.6 when the initial alkalinity was below PH 8.6. PH 8.6 appear

be the limit of alkaline production. The stronger the alkalinity of the initial media



quicker it reaches the maximum point. When the media's alcalinity is over 8.6, the wth is very poor and alteration of the reaction is also weaker.



When the PH of the media is below 7.0 the acidity is not marked. The alteration

of the reaction of the media having PH 5.2 and 4.4 is very slight. The acidity gradua decreases and tends to become alkaline.

5. The Relation of Toxin Production to Alteration of PH of the Culture Media.

This experiment was undertaken in order to determine the relation of toxin pr duction to alteration of PH of the culture media. The method employed in the prece ing section was also used in this experiment. Samples of the bouillon cultures we removed from time to time and filtered through a Berkefeld filter. The filtrate w injected into rabbits to determine the toxicity.

Two groups of media having initial PH of 8.6 and 7.4 were prepared. One havi PH 8.6 is called group "A" and the other having PH 7.4 is called group "B". Ea group was inoculated with the strain No. 33 and incubated for three days to four wee to determine the alteration of PH and toxicity. The results are as follows.

GROUP A.

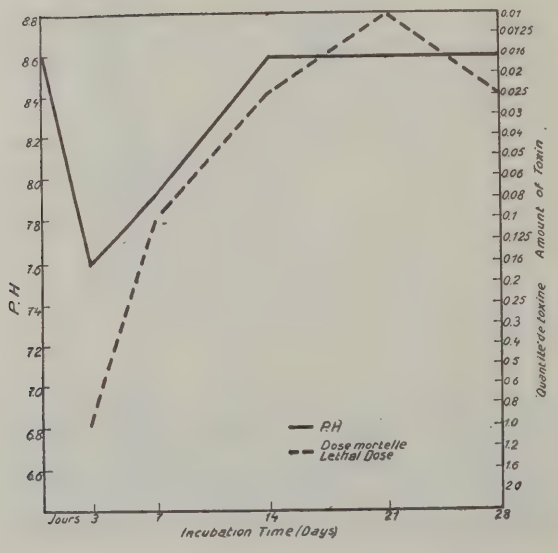
Incubation Time	Initial	3 days	1 week	2 weeks	3 weeks	4 weeks
Alteration of PH.	8.5	7.6	7.9	8.6	8.6	8.6
Minimum lethal dose per kilo.	—	1.0	0.1	0.025	0.01	0.025

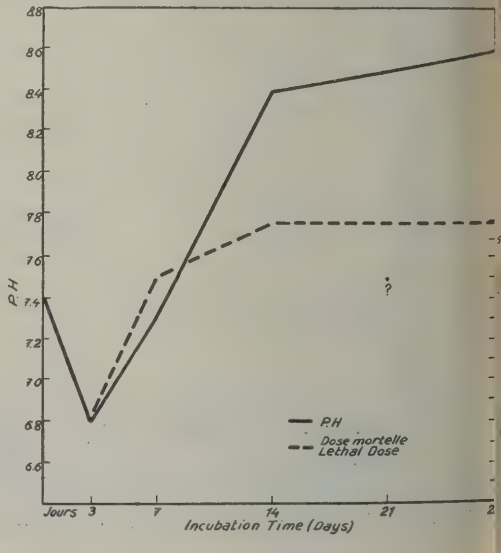
GROUP B.

Alteration of PH.	7.4	6.8	7.3	8.4	8.5	0.6
Minimum lethal dose per kilo.	—	1.0	0.2	0.1	0.2	0.1

The above results may be represented in curves.

CURVES I AND II.





According to the foregoing results, the toxicity increases with the increase of alkaity. When the alkalinity reaches a maximum the toxicity also reaches a maximum. lit in our experiments we proved that when the incubation time is prolonged over two eks a part of the toxin is destroyed. Therefore, when the initial alkalinity is weak requires prolonged incubation, but on account of the destruction of toxin after a cerin time the absolute toxicity cannot reach a very high point. On the other hand, ien the initial alkalinity is strong it reaches the maximum alkalinity quicker, and at e same time the toxicity reaches a maximum before the appearance of the destructive nenomenon. Therefore the absolute toxicity is also strong.

As will be seen in the curves, the alkalinity reaches a certain maximum (about I 8.6) in spite of some differences in the initial alkalinity, but the toxicity is stronger thin a certain limit in the media having stronger alkalinity in the first instance. Thus e toxicity of the group A media (PH 8.6) was stronger after any length of incubation an the group B (PH 7.4). When the toxicity reaches a maximum, the alkalinity of e media is always over PH 8.0. In our experiments all the toxins which had rather ong toxicity had alkalinity of over 8.0. Therefore, by determination of PH of media, know that toxicity has reached the maximum if the media have PH of about 8.6.

Conclusions.

1. When dysentery bacillus is planted in bouillon media, acid is produced in two to ree hours and increases the H-ion concentration and reaches a maximum point in six to ven hours. When the concentration of H-ion reaches a maximum point it remains there r one to two days, and then decreases gradually and finally becomes alkaline. When e alkalinity reaches a maximum point (PH 8.6) it remains there for a long time.

2. There is no marked difference in the alteration of PH of media by different strains.

3. Even in media having different initial PH, they reach a certain maximum PH ien the incubation time is prolonged. The maximum point is reached quicker in media oving higher initial PH. In other words, the weaker the initial alkalinity the longer it kes to reach the maximum alkalinity.

4. With the increase of alkalinity of media the toxicity increases. When the alkality reaches a maximum the toxicity of the culture reaches a maximum.

5. Unless the media develop alkalinity over PH 8.0 strong toxin cannot be obtained.

Protocols.

Experiment I. Group A (Initial PH 8.6). With three-days culture (Final PH 7.6).

abbit No.	Body weight in grams	Amt. of Injection (per kilo)	Course	Death or Survival	Autopsy Findings
22	1,730	1.0 cc.	Paralysis on 3rd, death on 8th day	Death	
33	1,930	1.2	Paralysis on 2nd, death on 4th day	Death	E and R
34	1,930	1.6	Paralysis next day, death 3rd day	Death	H and E
35	1,830	2.0	Death next day	Death	No change

Experiment II. Group B (Initial PH 7.4). With three-days culture (Final PH

Rabbit No.	Body weight in grams	Amt. of Injection (per kilo)	Course	Death or Survival	Autopsy Findings
2136	1,500	1.0 cc.	Death on 2nd day	Death	No chang
2137	1,850	1.2	Death on next day	Death	No chang
2138	1,800	1.6	Paralysis 2nd, death 3rd day	Death	No chang
2139	1,850	2.0	Paralysis 2nd, death 7th day	Death	No chang

Experiment III. Group A. With one-week culture (Final PH 7.9).

2148	1,460	0.025 cc.	No change	Survived	
2149	1,960	0.05	Death on next day	Death	No chang
2150	1,740	0.1	Paralysis 4th, death on 5th day	Death	E
2151	1,920	0.2	Paralysis and diarrhœa 4th, death on 6th day	Death	E

Experiment IV. Group B. With one-week culture (Final PH 7.3).

2152	1,850	0.025 cc.	No change	Survived	
2153	1,750	0.05	No change	Survived	
2154	1,800	0.1	No change	Survived	
2155	1,700	0.2	Paralysis 3rd, death on 4th day	Death	H and E

Experiment V. Group A. With two-weeks culture (Final PH 8.6).

2178	1,780	0.025 cc.	Paralysis and diarrhœa 4th, death on 7th day	Death	E and R
2162	1,620	0.05	Death on 3rd day	Death	H and E
2163	1,500	0.1	Paralysis and diarrhœa 3rd, death on 10th day	Death	No change
2164	2,000	0.2	Death on 2nd day	Death	H and E
2165	1,530	0.4	Death on 2nd day	Death	H, E and R

Experiment VI. Group B. With two-weeks culture (Final PH 8.4).

2181	1,510	0.025 cc.	Diarrhœa 3rd, recovery 5th day	Survived	
2174	1,850	0.05	No change	Survived	
2175	1,530	0.1	Death on 2nd day	Death	E and R
2176	1,525	0.2	Death on 2nd day	Death	E
2177	1,750	0.4	Diarrhœa 2nd, death on 3rd day	Death	H and E

Experiment VII. Group A. With three-weeks culture (Final PH 8.6).

bit o.	Body weight in grams	Amt. of Injection (per kilo)	Course	Death or Survival	Autopsy Findings
—	—	—	—	—	—
. . . . .	1,840	0.01 cc.	Paralysis 4th, death on 5th day	Death	No change
. . . . .	1,820	0.025	Paralysis 4th, death on 5th day	Death	No change
. . . . .	1,700	0.05	Paralysis 4th, death on 9th day	Death	No change
. . . . .	1,650	0.1	Death on 2nd day	Death	No change
. . . . .	1,620	0.2	Paralysis 2nd, death on 3rd day	Death	H, E and R
. . . . .	1,670	0.4	Paralysis and diarrhœa 4th day	Survived	

Experiment VIII. Group B. With three-weeks culture (Final PH 8.5).

. . . . .	1,510	0.01 cc.	No change	Survived	
. . . . .	1,800	0.025	No change	Survived	
. . . . .	1,530	0.05	No change	Survived	
. . . . .	1,680	0.1	No change	Survived	
. . . . .	1,450	0.2	Death on 3rd day	Death	No change
. . . . .	1,480	0.4	Death on 3rd day	Death	No change

Experiment IX. Group A. With four-weeks culture (Final PH 8.6).

. . . . .	1,320	0.025 cc.	Death on 4th day	Death	H and R
. . . . .	1,830	0.05	Death on next day	Death	No change
. . . . .	1,740	0.1	Paralysis 2nd, death on 5th day	Death	E
. . . . .	1,810	0.2	Paralysis 2nd, death on 5th day	Death	H and E
. . . . .	1,780	0.4	Paralysis 2nd, death on 3rd day	Death	H

Experiment X. Group B. With four-weeks culture (Final PH 8.6).

. . . . .	1,860	0.05 cc.	Death on 6th day	Death	
. . . . .	1,560	0.1	No change	Survived	
. . . . .	1,880	0.2	Paralysis 3rd, death on 6th day	Death	R
. . . . .	1,980	0.4	Paralysis next day, death on 5th day	Death	R

CHAPTER II

Method of Preparation of Immune Serum and its Efficiency Test

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A. INFLUENCE OF STORAGE OF THE TOXIN.

The following experiments were undertaken in order to determine the effect storage on the toxicity of toxin in the filtration of bouillon culture and also with aut lysed dysentery organism.

1. The filtrate of bouillon culture. The cultures of bouillon media having PH 8 were incubated for certain periods and filtered through a Berkefeld filter. Toluol w added to the filtrates, which were kept in an ice-chest until their use. The followi three toxins belonged to this category.

(*a*) No. 9 bouillon toxin (four-weeks culture).

(*b*) No. 13 bouillon toxin (three-weeks culture).

(*c*) No. 17 bouillon toxin (three-weeks culture).

2. Autolysed dysentery bacilli. A twenty-four-hour agar-culture was suspended salt solution, toluol added, and left to autolyse for two weeks at room temperatu Its filtrate was used as in preceding cases.

(*d*) No. 1 autolysed bacilli.

Method of Examination.

The foregoing various toxins were injected intravenously into the ear of rabbits a the smallest amount which killed the largest number of animals was determined.

The results of the examination are shown in the following charts. Notes. + ini cates the death of animal and the small figure indicates the number of days before t animal succumbed. O indicates survival of animal. Dotted line indicates the amou of probable lethal dose. The amount of toxin in the charts is calculated per kilogr of the body weight of animal.

No. 9. — Bouillon toxin.

MOUNT OF TOXIN	TIME OF STORAGE				
	Initial toxicity — Date of test VI 17 21	After 1 month — Date of test VII 22	After 2 months — Date of test VIII 21	After 5 months — Date of test XI 4	After 11 months — Date of test V 10
0.01	O				
0.025	O +17				
0.05	+2 +4	O +4	+3 +3	+3 +4	
0.1	+4 O	+1 +3	+7 O	+1 O	+3 +2
0.15	+4	+4 O	+5 O	+2 +1	+5 +5
0.2			+1 +2		+3 O
0.3					

No. 13. — Bouillon toxin.

MOUNT OF TOXIN	TIME OF STORAGE				
	Initial toxicity — Date of test VIII 21	After 1 month — Date of test IX 21	After 3 months — Date of test XI 4 7 15	After 5 months — Date of test I 22	
0.1	+6 O	OO	OO		
0.2	+5 +5	+2 +7	OO		
0.3	+3 O	+1 O	OO		
0.4		+5 O	+3 O	O +8	
0.5					
0.6			OO		
0.8				+3 +3	
1.0			+5 +5	O	
1.5					
2.0			+5 +3		
3.0					

No. 17. — Bouillon toxin.

AMOUNT OF TOXIN	TIME OF STORAGE					
	Initial toxicity		After 1 month		After 5 months	
	Date of test		Date of test		Date of test	
	X		XI		III	
	4	13	15	18	12	15	20
0.05	+7 +5	+4 O	+1 +6				
0.06							
0.08							
0.1	+5 O	+3 +3	O O				O +5
0.125			?				+4 +4
0.16							+3 +3 +5
0.2	+3 +2	+3 +4	+5 O	+5 +3			+3 +6 +6
0.25							+1 +4 +3 +4
0.3							+2 +2
0.4				+2 +3			+4 +2

No. 1. — Autolysed bacilli.

AMOUNT OF TOXIN	TIME OF STORAGE				
	Initial toxicity		After 2 months	After 4 months		
	Date of test		Date of test	Date of test		
	XI		I	III		
	7	18	16	6	9	12
0.016				+2		
0.02		+4 O	+4 +5	+7		+5 +6
0.025				+5		O O
0.033		?		+4	+2 +1	+2 +3
0.04				+1	+2 +1	
0.05	+1 +6	+5 +3	+2 +3	+4	+4 +2	
0.1	+2 +2	+2 +2	+1 +2			
0.2	+1 +2					

The most difficult point in the determination of the lethal dose is the difference in susceptibility of individual animals. For instance, when the lethal dose of animal A is 1, animal B may stand easily three or four times the lethal dose for A. On the other hand, a range animal C may die with one-half or two-thirds of the lethal dose for A. There is therefore between the extremes of from 1 to 10. Therefore, to determine the lethal dose of a toxin, a very large number of animals must be used. Even with a large number of animals, the standard cannot be determined unless a certain definition is drawn under a certain condition. We were not able to use a large enough number of animals to determine the dose very accurately. Our results, therefore, are comparative and not absolute. But the foregoing results show that the degree of decrease of the toxicity is not always the same with different toxins. As a whole, however, the toxicity shows a decrease with storage. In our experiments the toxicity of No. 13 was reduced to 1/5 cc. in three months, so that the minimum lethal dose increased from 0.2 cc. to 1.0 cc. This was the most marked one in our series. The others showed a less degree of decrease. Thus No. 9 bouillon toxin increased the minimum lethal dose of 0.05 cc. to 0.15 cc. in seven months. No. 17 bouillon toxin increased the minimum lethal dose of 0.1 cc. to 0.125 cc. in five months. No. 1 autolysed bacilli showed no appreciable changes in four months.

A detailed description of the indirect lethal dose will be given in the other section.

As we have shown in the foregoing experiments, we obtained far stronger toxin by autolysing organisms in suspension from agar culture than from bouillon culture. In preparing this autolysed toxin for this experiment, the agar culture was suspended either in saline solution or distilled water, and chloroform added (instead of toluol) to kill the organisms. The suspensions were then subjected to a temperature of 60° C. for one hour to obtain the bacterial extract. We found, however, that the use of toluol to kill the organisms in these suspensions gave far stronger toxins.

Protocol.

Experiment with No. 9 Bouillon Toxin (filtrate of four-weeks culture).

(Date June 17th, 1922.)

Rabbit No.	Body weight in grams	Amt. of Injection (per kilo)	Course	Death or Survival	Autopsy Findings
9.	1,900	0.05 cc.	Death on 2nd day	Died	R
10.	1,920	0.1	Paralysis from 2nd day, recovery after 7 days	Survival	
11.	1,420	0.1	Paralysis from 2nd, death on 4th day	Died	E
12.	1,450	0.15	Do.	Died	E

(Date June 21st, 1922.)

13.	1,760	0.05 cc.	Paralysis from 3rd, death on 4th day	Died	E, H and R
14.	1,750	0.025	Slight paralysis from 4th day, recovery after 7 days	Survival	
15.	1,820	0.025	Paralysis from 5th day, death on 7th day	Died	H and R
16.	1,680	0.01	Free from symptoms	Survival	

(Date July 22nd, 1922.)

Rabbit No.	Body weight in grams	Amt. of Injection (per kilo)	Course	Death or Survival	Autopsy Findings
262.	1,670	0.05 cc.	Free from symptoms	Survival	
263.	1,820	0.05	Paralysis and diarrhœa from 3rd, death on 5th day	Died	H and R
264.	1,850	0.1	Death on next day	Died	No change
265.	1,660	0.1	Paralysis from 2nd day, death on 4th day	Died	H, E and R
266.	1,500	0.15	Paralysis from 3rd day, recovery after 7 days	Survival	
267.	1,730	0.15	Paralysis from 2nd day, death on 5th day	Died	H and R

(Date August 21st, 1922.)

377.	1,850	0.05 cc.	Death on 3rd day	Died	R
378.	1,500	0.05	Death on 3rd day	Died	H and E
379.	1,500	0.1	Slight paralysis from 4th day, recovery after 7 days	Survival	
380.	1,890	0.1	Death on 7th day	Died	H
381.	1,730	0.15	Paralysis from 2nd day, recovery after 7 days	Survival	
382.	1,950	0.15	Paralysis from 2nd, death on 5th day	Died	H and E
383.	1,570	0.2	Death on 2nd day	Died	No change
384.	1,820	0.2	Death on next day	Died	H and E

(Date November 4th, 1922.)

723.	1,970	0.05 cc.	Death on 3rd day	Died	H and E
724.	1,800	0.05	Paralysis from 3rd, death on 4th day	Died	R
725.	1,850	0.1	Paralysis from 3rd day, recovery after 7 days	Survival	
726.	1,430	0.1	Death on next day	Died	
727.	1,950	0.2	Paralysis from next day, death on 3rd day	Died	E and R
728.	1,900	0.2	Death on next day	Died	E

(Date May 10th, 1922.)

2126.	1,700	0.1 cc.	Paralysis from 2nd, death on 3rd day	Died	H
2127.	1,850	0.1	Death on 2nd day	Died	No change
2128.	1,980	0.15	Paralysis from 3rd, death on 5th day	Died	E and R
2129.	1,960	0.15	Paralysis and diarrhœa from 3rd, death on 5th day	Died	H and E
2130.	1,900	0.2	Paralysis from 2nd, death on 3rd day	Died	H and R
2131.	1,760	0.2	Paralysis from 3rd day, recovery after 7 days	Survival	

Experiment with No. 13 Bouillon Toxin (filtrate of three-weeks culture).

(Date August 21st, 1922.)

Rabbit No.	Body weight in grams	Amt. of Injection (per kilo)	Course	Death or Survival	Autopsy Findings
5.	1,500	0.1 cc.	Paralysis and diarrhœa from 4th, death on 6th day	Died	H
6.	1,560	0.1	Free from symptoms	Survival	
7.	1,560	0.2	Paralysis from 3rd, death on 5th day	Died	H
8.	1,710	0.2	Paralysis from 3rd, death on 5th day	Died	H and E
9.	1,600	0.3	Paralysis from next day, death on 3rd day	Died	No change
10.	1,980	0.3	Paralysis from 3rd day, recovery after 7 days	Survival	

(Date September 21st, 1922.)

47.	1,420	0.1 cc.	Free from symptoms	Survival	
48.	1,560	0.1	Do.	Survival	
49.	1,600	0.2	Death on 2nd day	Died	E
50.	2,000	0.2	Paralysis from 2nd, diarrhœa from 3rd, death on 7th day	Died	H and R
51.	1,700	0,3	Free from symptoms	Survival	
52.	1,400	0.3	Death on next day	Died	No change
53.	1,600	0.4	Paralysis from 3rd day, recovery after 5 days	Survival	
54.	1,550	0.4	Paralysis from 3rd, diarrhœa from 4th, death on 6th day	Died	H and R

(Date November 4th, 1922.)

17.	1,350	0.1 cc.	Free from symptoms	Survival
18.	1,790	0.1	Do.	Survival
19.	1,700	0.2	Do.	Survival
20.	1,600	0.2	Do.	Survival
21.	1,680	0.3	Do.	Survival
22.	2,000	0.3	Do.	Survival

(Date November 7th, 1922.)

Rabbit No.	Body weight in grams	Amt. of Injection (per kilo)	Course	Death or Survival	Autopsy Findings
741.	2,000	0.4 cc.	Free from symptoms	Survival	
742.	1,630	0.4	Death on 3rd day	Died	No change
743.	1,680	0.6	Paralysis from 2nd day, recovery after 5 days	Survival	
744.	1,680	0.6	Free from symptoms	Survival	

(Date November 15th, 1922).

769.	1,420	1.0 cc.	Paralysis from 2nd day, death on 3rd day	Died	R
770.	1,750	1.0	Diarrhœa from 2nd day, death on 3rd day	Died	H and E
771.	1,550	2.0	Paralysis and diarrhœa from 2nd, death on 3rd day	Died	H and E
772.	1,950	2.0	Paralysis from 2nd, death on 3rd day	Died	E

(Date January 22nd, 1923.)

1880.	1,650	0.4	Free from symptoms	Survival	
1881.	1,790	0.4	Paralysis and diarrhœa from 3rd, death on 6th day	Died	H and E
1882.	1,790	0.8	Diarrhœa and paralysis from 3rd, death on 4th day	Died	E and R
1883.	1,750	0.8	Diarrhœa and paralysis from 2nd, death on 3rd day	Died	H and E
1884.	1,520	1.0	Paralysis from 3rd day, recovery after 6 days	Survival	

Experiment with No. 17 Bouillon Toxin (filtrate of three-weeks culture).

(Date October 4th, 1922.)

573.	1,840	0.05	Paralysis from 5th, death on 7th day	Died	H and E
574.	1,840	0.05	Paralysis from 3rd, death on 5th day	Died	H, E and R
575.	1,710	0.1	Free from symptoms	Survival	
576.	1,820	0.1	Diarrhœa from 5th, death on 6th day	Died	H and E
577.	1,740	0.2	Paralysis from 2nd, death on 3rd day	Died	E and R
578.	1,890	0.2	Death on 2nd day	Died	E

(Date October 13th, 1922.)

Rabbit No.	Body weight in grams	Amt. of Injection (per kilo)	Course	Death or Survival	Autopsy Findings
. . . . .	1,950	0.05 cc.	Paralysis from 3rd, death on 4th day	Died	
. . . . .	1,630	0.05	Free from symptoms	Survival	
. . . . .	1,820	0.1	Paralysis from 2nd, death on 3rd day	Died	E
. . . . .	2,000	0.1	Paralysis from 2nd, death on 3rd day	Died	E
. . . . .	2,000	0.2	Paralysis from 2nd, diarrhœa from 3rd, death on 4th day	Died	E
. . . . .	1,500	0.2	Paralysis from 3rd, death on 5th day	Died	E

(Date November 15th, 1922.)

. . . . .	1,660	0.05	Paralysis from 4th, death on 6th day	Died	H, E and R
. . . . .	1,500	0.05	Death on next day	Died	No change
. . . . .	1,650	0.1	Free from symptoms	Survival	
. . . . .	1,600	0.1	Slight paralysis from 4th day; recovery after 6 days	Survival	
. . . . .	1,800	0.2	Paralysis and diarrhœa from 3rd, death on 5th day	Died	E and R
. . . . .	1,620	0.2	Free from symptoms	Survival	

(Date November 18th, 1922.)

. . . . .	1,350	0.2	Death on next day	Died	E
. . . . .	1,730	0.2	Paralysis from 2nd, death on 5th day	Died	E
. . . . .	1,640	0.4	Paralysis from 2nd, death on 3rd day	Died	E and R
. . . . .	1,740	0.4	Death on 2nd day	Died	H, R and E

(Date March 12th, 1923.)

17	1,670	0.4	Paralysis from 2nd, death on 4th day	Died	E and R
18	1,960	0.4	Death on 2nd day	Died	E
19	2,230	0.33	Death on next day	Died	No change
20	1,960	0.33	Death on next day	Died	E and R
21	1,750	0.25	Paralysis from 3rd day, death on 4th day	Died	H
22	1,930	0.25	Death on next day	Died	No change

(Date March 15th, 1923.)

Rabbit No.	Body weight in grams	Amt. of Injection (per kilo)	Course	Death or Survival	Autopsy Findings
2059	2,050	0.25 cc.	Diarrhœa from 2nd, death on 3rd day	Died	H and E
2060	1,900	0.25	Paralysis from 3rd, death on 4th day	Died	H
2061	2,000	0.2	Paralysis from 3rd, death on 6th day	Died	E and R
2062	1,990	0.2	Death on 3rd day	Died	Pregnant
2063	1,860	0.16	Paralysis from 2nd, death on 3rd day	Died	H and E
2064	1,950	0.16	Paralysis from 2nd, death on 3rd day	Died	No change

(Date March 20th, 1923.)

2077	1,960	0.2	Death on 9th day	Died	No change
2078	1,740	0.16	Paralysis from 4th, death on 5th day	Died	H
2079	1,500	0.125	Diarrhœa and paralysis from 3rd, death on 4th day	Died	H
2080	1,680	0.125	Paralysis from 3rd, death on 4th day	Died	E and R
2081	1,800	0.1	Paralysis from 5th day, recovery after 10 days	Survival	
2082	1,680	0.1	Paralysis from 3rd, death on 5th day	Died	R

Experiment with No. 1 Autolysed Toxin.

(Date November 7th, 1922.)

745	1,750	0.05 cc.	Death in 5 hours after injection	Died	No chang
746	1,930	0.05	Death on 5th day	Died	H and E
747	1,730	0.1	Death on 2nd day	Died	E and R
748	1,960	0.1	Death on 2nd day	Died	E
749	1,615	0.2	Death in 5 hours after injection	Died	No chang
750	1,500	0.2	Death on 2nd day	Died	Do

(Date November 18th, 1922.)

789	1,900	0.02	Paralysis from next day, death on 4th day	Died	H and E
790	1,780	0.02	Paralysis from 5th day, recovery after 8 days	Survival	
791	1,880	0.05	Paralysis from 2nd day, death on 5th day	Died	E
792	1,580	0.05	Death on 3rd day	Died	No chang
793	1,780	0.1	Death on 2nd day	Died	E
794	1,450	0.1	Death on 2nd day	Died	E

(Date January 16th, 1923.

Rabbit No.	Body weight in grams	Amt. of Injection (per kilo)	Course	Death or Survival	Autopsy Findings
009.	1,560	0.02 cc.	Paralysis from 2nd, death on 5th day	Died	E and H
010.	1,620	0.02	Paralysis from 2nd, death on 4th day	Died	E and H
011.	1,890	0.05	Death on 2nd day	Died	No change
012.	1,560	0.05	Paralysis from 2nd, death on 3rd day	Died	E and R
013.	1,490	0.1	Death on next day	Died	No change
014.	1,870	0.1	Death on 2nd day	Died	E

(Date March 6th, 1923.)

085.	1,800	0.05	Paralysis from 2nd, death on 4th day	Died	R and H
086.	1,850	0.04	Death on next day	Died	Pregnant
087.	1,800	0.033	Death on 4th day	Died	E and H
088.	2,030	0.025	Paralysis from 4th, death on 5th day	Died	E and R
089.	1,770	0.02	Paralysis from 4th, death on 7th day	Died	No change
090.	1,870	0.016	Death on 2nd day	Died	Do.

(Date March 9th, 1923.)

099.	1,500	0.05	Paralysis from 3rd, death on 5th day	Died	E and R
000.	1,700	0.05	Death on 2nd day	Died	E
001	1,680	0.04	Death on 2nd day	Died	E and H
002	1,730	0.04	Death on 2nd day	Died	No change
003	1,850	0.033	Death on 2nd day	Died	H
004	1,970	0,033	Death on 2nd day	Died	E

(Date March 12th, 1923.)

023	1,560	0.033	Paralysis from 2nd, death on 3rd day	Died	E and R
024	2,000	0.033	Death on 2nd day	Died	E
025	1,950	0.025	Paralysis and diarrhœa from 4th day, recovery after 8 days	Survival	
026	1,700	0.025	Free from symptoms	Survival	
027	1,710	0.02	Paralysis and diarrhœa from 3rd-4th, death on 6th day	Died	H and R
028	2,000	0.02	Paralysis from 3rd, death on 9th day	Died	No change

B. COMPARISON OF MATERIALS FOR ANTIGENS

In the preparation of immune serum, the selection of proper antigen is very impo tant. We selected the following three antigens and made comparisons of each.

1. A twenty-four-hour agar-culture suspended in salt solution and heated at 60° f one hour (1 cc. of the suspension contained 2 mg of the organism).

2. A one-week bouillon culture to which was added 0.5 % carbolic acid to kill th organism.

3. The filtrate of a two-weeks bouillon culture.

The anti-toxic and anti-bactericidal effects of the immune sera prepared by usin the above three antigens were determined.

Method of examination of the anti-toxic effect of the immune serum.

A certain amount of toxin (twenty times the minimum lethal dose per kilogran of body weight of the rabbit) was mixed with various amounts of the serum and incu bated for a-half to one hour. Then the mixture was injected intravenously into th rabbit to determine the amount of antitoxin which just neutralises the toxin. Ord narily, an amount of immune serum which just neutralises the toxin and saves the ani mal is determined. But it is difficult to employ such a method with a small number c animals and also to determine the neutralising amount accurately, for experimental an mals often die from unknown causes even when the toxin had just been neutralisec or they may survive if a surplus toxin does not reach the lethal dose. Since there ar wide differences in the susceptibility of animals to dysentery toxin, some animals ma stand easily several times the lethal dose, so that, even when a large amount of unneu tralised toxin remains, the experimental animals may survive. The animals, howeve always died when unneutralised toxin remained over a certain amount. Therefore, it more feasible to determine a maximum amount of immune serum which, mixed with certain amount of toxin, yet kills the great majority of the animals, than to determir a minimum amount of the serum which neutralises the toxin dose and saves the exp rimental animal. In our experiments, twenty times the lethal dose of toxin was take as standard and the maximum amount of immune serum which, mixed with the abo standard amount of toxin, yet kills the animal was determined. This amount of immur serum is called L + for that amount of toxin.

The results of the experiments to determine the anti-toxic effects of immune seru by the above method are shown in the following chart.

The black line indicates the effective margin of the immune serum.

Chart.

Amount of serum	Kind of antigen: Suspension of Agar culture — Serum No. 128	Suspension of Agar culture — Serum No. 129	Bouillon culture — Serum No. 136	Bouillon culture — Serum No. 137	Filtrate of Bouillon culture — Serum No. 130	Filtrate of Bouillon culture — Serum No. 131
1 : 800	+1					
1 : 600	+1					
1 : 500	O					
1 : 400	+2					
1 : 300	+2					
1 : 350	+1					
1 : 200	Θ1					
1 : 160	O	+4			+2	+2
1 : 125	O	+4				
1 : 100	O	Θ1		+1		
1 : 80	O	O			+2	+1
1 : 60	Θ1	Θ1		+2		
1 : 50		O				
1 : 40				+1	+2	+3
1 : 30						
1 : 25						
1 : 20					+2	+1
1 : 16						
1 : 12				O		
1 : 10			+1		O	+6
1 : 8			+2	O		
1 : 6			+2			
1 : 5			+1	O	O	+3
1 : 4			+2			
1 : 3			+2			

As the chart indicates, the L + of horse sera immunised with the suspension agar culture were as follows :

No. 128 immune horse serum. . . . . 1/250 cc.
No. 129 immune horse serum. . . . . 1/125 cc.

The results of immunisation with bouillon culture were as follows :

No. 136 immune serum had no appreciable anti-toxic power.
No. 137 immune horse serum. . . . . 1/40 cc.

The results of immunisation with the filtrate of bouillon were as follows :

No. 130 immune horse serum. . . . . 1/20 cc.
No. 131 immune horse serum had no appreciable anti-toxic power.

The results of the foregoing experiments show that, when dysentery organism used as antigen, strong immunity in the animal is produced, the bouillon culture filtrate of bouillon culture being much inferior as antigen.

The reactions produced in immunising animals by injection of various antigens important from a practical point of view. An antigen must be selected which produ the least reaction in the animal but produces high immunity. Comparison of the f going three antigens shows that suspension of fresh agar-culture produces the le reaction in the animal, while the bouillon culture or filtered toxin produces the ne violent reaction. This may be due to the presence of non-specific proteins in the cult We omit the description of the course of immunity in each animal, but the res obtained during March 1922 to June 1923 are as follows :

The total number of horses used for this immunity work was 16, six with bac four with bouillon culture, and six with filtrate toxin. Of the six horses used for im nity with bacilli, four animals obtained a certain degree of immunity and two are i in the course of immunisation. Of four horses used with bouillon culture, two obtai a certain degree of immunity and two died. Of six horses used with the filtered to two obtained a certain degree of immunity. With one the experiment stopped on acco o emaciation, one is still in course of immunisation and three died.

The foregoing results in tabular form are as follows :

Antigen	Immunity Successful	Immunity in Continuation	Stopped Immunity	Death
Bacilli.	66 %	34 %	—	—
Bouillon culture	50 %	—	—	50 %
Filtrate	17 %	16 %	17 %	50 %

The above experiments show that immunisation with bacilli is far better than with other antigens in obtaining a high degree of immunity and least harmful to the anim Bouillon culture is the next best and the filtrate-toxin is least fitted for immunisation.

Protocols on the Comparison of Materials for Antigens.

Immune Horse Serum immunised with Agar-Culture Bacilli. Antitoxic Test of No. 128 Horse Serum.

Rabbit No.	Body weight in grams	Amt. of Serum	Course	Death or Survival	Autopsy Findings
01	1,970	1 : 60	Death on next day	Died	No change
02	1,550	1 : 80	Free from symptoms	Survival	
03	1,670	1 : 100	Do.	Survival	
04	1,550	1 : 125	Do.	Survival	
05	1,670	1 : 160	Do.	Survival	
06	1,760	1 : 200	Death on next day	Died	No change
07	1,620	1 : 250	Death on next day	Died	H, E and R
08	1,620	1 : 300	Death on next day	Died	H, E and R
09	1,550	1 : 400	Death on next day	Died	H, E and R
10	1,400	1 : 500	Free from symptoms	Survival	
11	1,770	1 : 600	Paralysis from 2nd, death on 4th day	Died	H and E
12	1,700	1 : 800	Death on next day	Died	No change

Antitoxic Test of No. 129 Horse Serum.

25	1,800	1 : 50	Free from symptoms	Survival	
26	1,820	1 : 60	Death on next day	Died	No change
27	1,870	1 : 80	Free from symptoms	Survival	
28	1,620	1 : 100	Death on next day	Died	No change
29	1,950	1 : 125	Paralysis from 5th, death on 7th day	Died	H and E
30	1,550	1 : 160	Paralysis from 2nd, death on 4th day	Died	H and E

II. Immune Serum immunised with Bouillon Culture. Antitoxin Test of No. 136 Horse Serum.

[illegible]	1,700	1 : 3	Death on next day	Died	H, R and E
[illegible]	1,660	1 : 4	Death on next day	Died	H, E and R
[illegible]	1,900	1 : 5	Death on 4th day	Died	H, E and R
[illegible]	1,550	1 : 6	Death on next day	Died	H and E
[illegible]	2,000	1 : 8	Death on next day	Died	H and E
[illegible]	1,840	1 : 10	Death on next day	Died	No change

Antitoxin Test of No. 137 Horse Serum.

[illegible]	1,650	1 : 40	Death on next day	Died	No change
[illegible]	1,850	1 : 60	Death on next day	Died	Do.
[illegible]	2,000	1 : 100	Death on next day	Died	Do.
[illegible]	1,850	1 : 12	Free from symptoms	Survival	
[illegible]	1,500	1 : 8	Free from symptoms	Survival	
[illegible]	1,700	1 : 5	Death on next day	Died	No change

III. *Immune Serum immunised with Filtrate of Bouillon Culture.*
Antitoxin Test of No. 130 Horse Serum.

Rabbit No.	Body weight in grams	Amt. of Serum	Course	Death or Survival	Autopsy Findings
525	1,500	1 : 5	Free from symptoms	Survival	
526	1,520	1 : 10	Paralysis from 3rd day, recovery after 8 days	Survival	
527	1,640	1 : 20	Death on next day	Died	No change
528	1,680	1 : 40	Do	Died	E and H
529	1,650	1 : 80	Do.	Died	E and H
530	1,800	1 : 160	Do.	Died	E and R

Antitoxin Test of No. 131 Horse Serum.

519	1,520	1 : 5	Paralysis from 2nd, death on 3rd day	Died	E
520	1,740	1 : 10	Death on 6th day	Died	E and H
521	1,720	1 : 20	Death on the next day	Died	No change
522	1,820	1 : 40	Paralysis from 3rd, death on 5th day	Died	E and H
523	1,870	1 : 80	Death on next day	Died	No change
524	1,600	1 . 160]	Death on next day	Died	Do.

C. ANTITOXIC TEST OF DYSENTERY IMMUNE SERUM

The following experiments were undertaken in order to determine how accura the antitoxic test is and also to test the efficacy of dysentery immune serum.

Does the neutralisation of the dysentery toxin and the dysentery immune seru follow the so-called Ehrlich's law of multiplication?

The quantity of immune serum required for neutralisation of certain amounts o toxin was determined. For instance, the quantity of No. 129 immune horse seru required to neutralise 1, 2, and 4 cc. of No. 17 toxin was determined. The test methl was the same as in the preceding section, 1 cc. of the immune serum of different di- tions being mixed with different amounts of the toxin and incubated for a-half to o hour and then injected intravenously into rabbits. The quantity of L + of the immu serum was determined. The results of the experiments are shown in the following ch (see also the protocol).

Notes : O indicates survival of animal and + indicates death. The small figu indicates the number of days before death. Dotted line shows the L +. ⊕ indica death from unknown causes.

Chart I.

No. 129 Serum + No. 17 Toxin.

Amount of Serum	Amount of Toxin		
	4 cc. (40 × M. L. D.)	2 cc. (20 × M. L. D.)	1 cc. (10 × M. L. D.)
1 : 300			
1 : 400			
1 : 500	O O		
1 : 600	O ⊖		
1 : 800	⊖ +/5 +/3 +/3		
1 : 1000	+/2 +/4 +/2 +/7		
1 : 1250	+/4 +/3	⊖1 O	
1 : 1600		+/5 O ⊖1 O	
1 : 2000		⊖1 +/3 +/3 +/4	
1 : 2500		+/4 +/3 +/1 +/3	
1 : 3000			+/6 O
1 : 4000			+/3 O +/4 O
1 : 5000			+/3 O +/2 +/8
1 : 6000			+/3 +/5 +/1 +/2
1 : 8000			
1 : 10000			

If the neutralisation of the immune serum and toxin follows the law of multiplication, the L + of this serum is 1/2000 cc. with 2 cc. of the toxin, the L + with 4 cc. of the toxin must be 1/1000 and 1/4000 with 1 cc. of the toxin. But the actual results show that the L + of the serum with 4 cc. of the toxin is 1/800 cc. and 1/6000 with 1 cc. of the toxin. It therefore appears that the neutralisation does not follow the law of multiplication. It does not indicate, however, that the toxin is completely neutralised with a slightly larger quantity of the serum than the L + when the experimental animal survives. It may be that the quantity of the free unneutralised toxin had not reached the lethal dose. If the immune serum and toxin are multiplied at the same rate, the free toxin will also increase at the same rate. Consequently, the quantity of free unneutralised toxin may be either below or above the lethal dose or may be at the lethal dose.

In other words, if (A) represents antitoxin which neutralises (T), a quantity of

toxin, and if (t) represents a quantity of free toxin which surely kills an experiment animal, then the quantity of antitoxin is (A) to express L + for the quantity of toxi ($T + t$).

Thus graphically expressed :

$$L + = A + (T + t).$$

If the quantity of toxin in the above formula is multiplied by p, that is $p(T + t)$, tl quantity of antitoxin pA to express L + is not sufficient, but some more antitoxin mu be added, besides pA, to neutralise $(p - 1)\ t$ toxin.

This relation has been clearly shown in our experiments. Thus, it is apparent i testing that with a large quantity of toxin it would require a larger quantity of ant toxin than with a small quantity.

But if we take into consideration the variation of dissociation in differences concentration of a mixture of toxin and antitoxin, the problem becomes extremely con plicated. We may elucidate this point at some future time.

If L indicate the average lethal dose and L′ the actual lethal dose (L<L′) and the quantity of the immune serum to neutralise L, the quantity of the toxin to neutr lise mA quantity of the serum is mL. But the quantity of the toxin required to mal mA quantity of the serum as L + is mL + L′. If the serum and the toxin are mult plied by p, the toxin would be pmL + pL′ and the serum would be pmA. When bot substances are mixed, pL′ or p times the toxin corresponding to the actual lethal do will remain unneutralised. Therefore, to neutralise this to make it L +, enough seru should be added to neutralise $(p - 1)$ L′ in addition to pmA. Our experiment shov clearly why the neutralising value is very high when a small quantity of toxin is take as a standard to test the serum and comparatively low when a large quantity of toxi is used as standard.

When we reconsider the whole question carefully, the neutralisation of the tox and anti-toxin of dysentery bacillus follows the law of multiplication according to ou experiments. In estimating the neutralising value of the serum, the transition betwee the death and survival is not accurate if small quantities of the toxin are used, bu with large quantities of the toxin L + can be accurately determined. In using a larg quantity of the toxin it must, however, be highly toxic, for injection of a large quantit may produce non-specific death of the animal by admixture of other materials. Fo this reason the *autolysed bacterial toxin which contains least of the other substances and y produces high toxin would give far more accurate results than the other toxins.*

Can Uniform Results be obtained with the Lethal Dose of Toxin as Standard in testi Efficacy of Immune Serum?

In order to solve this question, the neutralising value of a serum was determine with a certain quantity of each of two kinds of toxins, and then the lethal dose of th toxins was determined to detect the existence of the possible relation between the ne tralising value and the lethal dose.

The toxins used in this experiment were No. 1 autolysed bacterial toxin and No. 1 bouillon toxin. With 4 cc. of these toxins L + of the dried serum No. 128 was dete mined. The results were as follows :

Notes O indicates survival of animal, +. death. The small figures below ind cate the number of days before death. ⊕ indicates non-specific death.

Chart II.

Dried Serum No. 128.

Amount of serum	Toxin	
	No. 1 toxin 4 cc. (120 × M. L. D.)	No. 17 toxin 4 cc. (32 × M. L. D.)
1 : 800	O O O	
1 : 960	O Θ_1	
1 : 1000	O Θ_1 O O O	
1 : 1040	$+_2$ Θ_1 $+_4$ $+_6$ $+_9$	
1 : 1080	$+_2$ $+_1$ $+_3$ $+_2$	
1 : 1120	$+_1$ $+_1$	
1 : 1200	$+_2$ $+_2$ $+_1$	
1 : 1600	$+_1$ $+_1$ $+_1$	
1 : 2000		
1 : 2400		
1 : 3200		O O O O
1 : 4000		$+_1$ Θ_1 O O
1 : 5000		$+_7$ $+_1$ Θ_1 $+_3$ $+_3$
1 : 6400		$+_3$
1 : 8000		$+_1$
1 : 10000		$+_1$

As the above table shows, the lethal dose determined with 4 cc. of the No. 1 toxin i 1/1040 cc. and with No. 17 is 1/5000 cc. If the lethal dose and the neutralising value rn in parallel No. 1 toxin must be four to five times stronger than No. 17. The deter- nation of the toxicity of these two toxins shows that the minimum lethal dose of). 1 is 1/30 cc. and that of No. 17 is 1/8 cc. Therefore the quantity of the toxin con- tined in each 4 cc. is 120 times the lethal dose of the toxin No. 1, and 32 times that of the txin No. 17. Thus the toxin No. 1 is about four times stronger than No. 17. We not claim that the results agree absolutely with the neutralising value of the serum, l.t we can say that the toxicity runs in parallel with the neutralising value of the srum. In other words, *we believe that the efficacy of a serum can be tested without uch error with the toxicity of the toxin or the lethal dose as standard.*

Do the Results always agree in testing various Immune Serums with Different Toxins?

The immune sera No. 46 and No. 129 A were tested with the dried toxin No. and toxin No. 13. The immune sera No. 128 and No. 129 B were tested with the toxin No. 1 and No. 17. The results are as follows :

CHART III.

AMOUNT OF SERUM	KIND OF SERUM			
	No. 129 serum (A)		No. 46 serum	
	Toxin — Dried toxin A (20 × M. L. D.)	Toxin — No. 13 toxin (10 × M. L. D.)	Toxin — Dried toxin A (20 × M. L. D.)	Toxin — No. 13 toxin (10 × M. L. D.)
1 : 5				
1 : 6			O O	
1 : 8			O O	
1 : 10			----	
1 : 12			+½ +⅙	
1 : 16				O
1 : 20				O
1 : 25	⊕			----
1 : 30	O			+½
1 : 40	O +⅙			+⅓
1 : 50	----			+1
1 : 60	O +⅓	O		+1
1 : 80	+⅙ +⅓	⊕		
1 : 100	+1 +1	O		
1 : 125	+1	O		
1 : 160		----		
1 : 200		+⅙		
		+⅓		

CHART IV.

AMOUNT OF SERUM	KIND OF SERUM			
	No. 128 serum		No. 129 serum (B)	
	Toxin — No. 17 toxin (16 × M. L. D.)	Toxin — No. 1 toxin (30 × M. L. D.)	Toxin — No 17 toxin (16 × M. L. D.)	Toxin — No. 1 toxin (30 × M. L. D.)
1 : 200				
1 : 250				
1 : 300				
1 : 400				
1 : 500				O
1 : 600				Θ_1
1 : 800	Θ	O O	O	$+_5$
1 : 1000	O O O	$+_3$ $+_4$	O	O
1 : 1250	$+_{11}$ O O	$+_2$ O	O	$+_5$
1 : 1600	Θ O $+_7$	$+_2$ $+_2$	O	$+_2$
1 : 2000	$+_3$ Θ_1 $+_3$	$+_2$ $+_3$	$+_7$ O	
1 : 2500	$+_1$ $+_2$ $+_2$	$+_3$ $+_2$	$+_5$ $+_2$	
1 : 3000	$+_3$ $+_2$		$+_2$ $+_3$	
1 : 4000			$+_1$ $+_2$	
1 : 5000				
1 : 6000				

According to the foregoing results, the L + of the immune serum No. 129 A tested th twenty times the lethal dose of the dried toxin A is 1/50 cc. When the same serum tested with 4 cc. of No. 13 toxin the L + is 1/125 cc. The L + of the immune serum). 46 tested with the same quantity of the dried toxin A is 1/10 cc. When the same um is tested with 4 cc. of the toxin No. 13 the L + is 1/25 cc. Thus in any immune um the L + with 4 cc. of the toxin No. 13 is two and a-half times that tested with 2 times the lethal dose of the dried toxin A.

The L + of the immune serum No. 128 tested with two (2) cc. of the toxin No. 17 1/2000 cc. When the same serum is tested with 1 cc. of No. 1 toxin the L + is 1.000 cc. The L + of the immune serum No. 129 tested with the same quantity of). 17 is 1/2500 cc., and that with No. 1 toxin is 1/1250 cc. In this case also the L + any serum tested with 2 cc. of the toxin No. 17 is two times that tested with 1 cc. the toxin No. 1.

The foregoing experimental results show that, in testing the antitoxic values various sera with different toxins, the neutralising power always runs parallel with a toxin. If the antitoxic values of immune sera are determined with corresponding quantities of toxins according to their toxicity, the results would always be the same.

The toxin No. 1 is autolysed bacteria, but the neutralising power with the serum the same as the filtrated toxin of fluid culture.

Conclusion : *The neutralisation of the dysentery toxin and antitoxin follows the l of multiplication to a certain degree. The neutralising value of dysentery toxin with immu serum runs parallel with the toxicity. The method of determination of the efficacy of t immune serum with the lethal dose of toxin as standard gives a fairly accurate result.*

Protocols on the Antitoxic Test of Dysentery Serum.

Protocol of Chart I.

1 cc. of No. 17 toxin (10 times the minimum lethal dose per kilo) was mixed wi various amounts of No. 129 serum, and L + was determined.

Rabbit No.	Body weight in grams	Amt. of Serum	Course	Death or Survival	Autopsy Findings
801	1,610	1 : 4000	Free from symptoms	Survival	
802	1,550	1 : 4000	Death on 5th day	Died	E and H
803	1,650	1 : 5000	Paralysis from 2nd, death on 3rd day	Died	E and H
804	1,650	1 : 5000	Paralysis from 3rd day, recovery after 7 days	Survival	
805	1,650	1 : 6000	Paralysis from 3rd, death on 5th day	Died	E and H
806	1,900	1 : 6000	Paralysis from 2nd, death on 3rd day	Died	E
861	1,840	1 : 3000	Free from symptoms	Survival	
862	1,700	1 : 3000	Death on 6th day	Died	E and H
863	1,680	1 : 4000	Paralysis from 3rd, death on 4th day	Died	E and H
864	1,820	1 : 4000	Paralysis from 3rd day, recovery after 5 days	Survival	
865	1,730	1 : 5000	Paralysis from 3rd, death on 6th day	Died	E and H
866	1,820	1 : 5000	Death on 2nd day	Died	E
867	1,670	1 : 6000	Death on 2nd day	Died	E and H
868	1,950	1 : 6000	Paralysis from 2nd, death on 3rd day	Died	E and H

2 cc. of No 17 toxin (20 times the minimum lethal dose per kilo) was mixed with rious amounts of the serum, and L + was determined.

bbit lo.	Body weight in grams	Amt. of Serum	Course	Death or Survival	Autopsy Findings
07	1,840	1 : 1600	Free from symptoms	Survival	
08	1,870	1 : 1600	Death on 5th day	Died	E
09	1,970	1 : 2000	Death on next day	Died	No change
10	1,610	1 : 2000	Paralysis from 2nd, death on 3rd day	Died	E and R
11	1,970	1 : 2500	Paralysis from next day, death on 3rd day	Died	No change
12	1,900	1 : 2500	Paralysis from 2nd, death on 3rd day	Died	E, H and R
69	1,550	1 : 1250	Death on next day	Died	No change
70	1,730	1 : 1250	Free from symptoms	Survival	
71	1,800	1 : 1600	Free from symptoms	Survival	
72	1,640	1 : 1600	Death on next day	Died	No change
73	1,530	1 : 2000	Paralysis from 2nd, death on 4th day	Died	R
74	1,740	1 : 2000	Paralysis from 2nd, death on 3rd day	Died	H and E
75	1,660	1 : 2500	Death on next day	Died	E
76	1,630	1 : 2500	Death on 3rd day	Died	E

4 cc. of the toxin (40 times the minimum lethal dose per kilo) was mixed with various amounts of No. 129 serum and L + of the serum was determined.

bbit No.	Body weight in grams	Amt. of Serum	Course	Death or Survival	Autopsy Findings
13	1,620	1 : 800	Paralysis from 4th, death on 5th day	Died	No change
14	1,750	1 : 800	Death on next day	Died	No change
15	1,950	1 : 1000	Death on next day	Died	E and H
16	1,940	1 : 1000	Paralysis and diarrhœa from 3rd, death on 4th day	Died	E and H
17	1,740	1 : 1250	Death on next day	Died	E
18	1,620	1 : 1250	Paralysis from 2nd, death on 3rd day	Died	E and H
77	1,760	1 : 500	Free from symptoms	Survival	
78	1,630	1 : 500	Do.	Do.	
79	1,860	1 : 600	Death on next day	Died	No change
80	1,750	1 : 600	Free from symptoms	Survival	
81	1,780	1 : 800	Death on 3rd day	Died	E, H and R
82	1,980	1 : 800	Paralysis from 2nd, death on 3rd day	Died	E and H, Pregnant
83	1,920	1 : 1000	Paralysis from 2nd, death on 3rd day	Died	E and R
84	1,780	1 : 1000	Death on 2nd day	Died	E and R

Protocol of Chart II.

With 4 cc. of toxin No. 1 (120 times the minimum lethal dose per kilo) L + of t
dried serum No. 128 was determined.

Rabbit No.	Body weight in grams	Amt. of Serum	Course	Death or Survival	Autopsy Findings
969	1,970	1 : 800	Free from symptoms	Survival	
970	1,760	1 : 800	Do.	Do.	
971	1,850	1 : 1600	Death on next day	Died	E and H
972	1,850	1 : 1600	Death on next day	Died	No change
973	1,580	1 : 3200	Paralysis from next, death on 3rd day	Died	E and H
974	1,950	1 : 3200	Death on next day	Died	No change
975	2,000	1 : 800	Free from symptoms	Survival	
976	1,880	1 : 1000	Death on next day	Died	No change
977	1,700	1 : 1000	Free from symptoms	Survival	
978	1,850	1 : 1200	Paralysis from next, death on 3rd day	Died	H and R
979	1,800	1 : 200	Paralysis from next, death on 2nd day	Died	H
980	1,750	1 : 600	Death on next day	Died	No change
981	1,550	1 : 1040	Paralysis from next day, death on 3rd day	Died	H
982	1,700	1 : 1080	Death on 2nd day	Died	H
983	1,930	1 : 1080	Death on 4th day	Died	H
991	1,610	1 : 1200	Paralysis from 3rd, death on 4th day	Died	H and E
992	1,170	1 : 1120	Death on next day	Died	Pregnant
993	1,900	1 : 1120	Death on next day	Died	Pregnant
994	1,790	1 : 1080	Death on 3rd day	Died	No change
995	1,640	1 : 1080	Death on next day	Died	No change
996	1,740	1 : 1040	Death on next day	Died	Do.
997	1,610	1 : 1040	Death on 4th day	Died	Do.
998	1,500	1 : 1000	Free from symptoms	Survival	
2035	1,780	1 : 960	Death on next day	Died	No change
2036	1,720	1 : 960	Free from symptoms	Survival	
2037	1,610	1 : 1000	Slight paralysis from 2nd, recovery after 5 days	Survival	
2038	1,670	1 : 1000	Do.	Survival	
2039	1,650	1 : 1040	Death on 6th day	Died	No change
2040	1,880	1 : 1040	Death on 9th day	Died	H and E

With 4 cc. of No. 17 toxin (32 × M.L.D.), L + of the dried serum No. 128 was termined.

Rabbit No.	Body weight in grams	Amt. of Serum	Course	Death or Survival	Autopsy Findings
230	1,800	1 : 5000	Paralysis from 3rd, death on 7th day	Died	E, H and R
231	1,850	1 : 6400	Paralysis from 2nd, death on 4th day	Died	E
232	1,810	1 : 8000	Death on next day	Died	H
233	1,740	1 : 1000	Death on next day	Died	No change
265	1,610	1 : 3200	Free from symptoms	Survival	
266	1,930	1 : 3200	Do.	Do.	
267	1,910	1 : 4000	Death on 4th day	Died	No change
268	1,680	1 : 4000	Death on next day	Died	Do.
269	1,960	1 : 5000	Death on next day	Died	Do.
270	1,820	1 : 5000	Do.	Do.	H and E
271	1,680	1 : 3200	Free from symptoms	Survival	
272	1,770	1 : 3200	Do.	Do.	
273	1,750	1 : 4000	Do.	Do.	
274	1,780	1 : 4000	Do.	Do.	
275	2,000	1 : 5000	Paralysis from 4th, death on 6th day	Died	H and E
276	1,980	1 : 5000	Paralysis and diarrhœa from 3rd, death on 5th day	Died	H

Protocol of Chart III.

With 4 cc. of No. 13 toxin (10 × M.L.D.), L + of No. 46 serum was determined.

Rabbit No.	Body weight in grams	Amt. of Serum	Course	Death or Survival	Autopsy Findings
53	1,800	1 : 16	Free from symptoms	Survival	
54	1,950	1 : 20	Do.	Do.	
55	1,880	1 : 25	Death on 2nd day	Died	E and R
56	1,620	1 : 30	Death on 3rd day	Died	H and E
57	1,580	1 : 40	Death on next day	Do.	No change
58	1,120	1 : 50	Do.	Do.	Do.

PROTOCOL OF CHART III (*continued*).

With 4 cc. of No. 13 toxin (10 × M.L.D.), L — of the serum No. 129 was dete mined.

Rabbit No.	Body weight in grams	Amt. of Serum	Course	Death or Survival	Autopsy Findings
495	1,880	1 : 50	Free from symptoms	Survival	
496	1,620	1 : 60	Death on next day	Died	No change
497	1,870	1 : 80	Free from symptoms	Survival	
498	1,620	1 : 100	Death on next day	Died	No change
499	1,950	1 : 125	Death on 6th day	Died	H and E
500	1,550	1 : 160	Death on 4th day	Died	H and E

With 20 times the lethal dose of the dried toxin A, L + of No. 46 serum was determine

399	1,450	1 : 6	Free from symptoms	Survival	
400	1,550	1 : 6	Do.	Do.	
401	1,800	1 : 8	Do.	Do.	
402	1,660	1 : 8	Paralysis from 3rd day, recovery after 6 days	Do.	
403	1,880	1 : 10	Paralysis from next day, death on 4rd day	Died	
404	1,860	1 : 10	Death on 6th day	Died	

With 20 times the lethal dose of the dried toxin A, L + of No. 129 serum wa determined.

477	1,840	1 : 25	Death on next day	Died	No change
478	2,030	1 : 30	Free from symptoms	Survival	
479	1,730	1 : 40	Do.	Do.	
480	1,770	1 : 50	Death on next day	Died	No change
481	1,770	1 : 60	Paralysis from 3rd, death on 6th day	Died	R
482	1,770	1 : 80	Death on next day	Died	No change
507	1,880	1 : 40	Paralysis from 6th, death on 8th day	Died	H and E
508	1,920	1 : 50	Paralysis from 4th, death on 5th day	Died	H and E
509	1,920	1 : 60	Paralysis from 2nd, death on 4th day	Died	H and E
510	1,560	1 : 80	Death on next day	Died	No change
511	1,840	1 : 100	Do.	Do.	Do.
512	1,960	1 : 125	Do.	Do.	Do.

Protocol of Chart IV.

With 2 cc. of No. 17 toxin (16 × M.L.D.), L + of No. 128 serum was determined.

abbit No.	Body weight in grams	Amt. of Serum	Course	Death or Survival	Autopsy Findings
357	1,720	1 : 800	Death on next day	Died	No change
358	1,770	1 : 1000	Free from symptoms	Survival	
359	2,000	1 : 1250	Paralysis from 4th, death on 11th day	Died	E
360	1,830	1 1600	Death on next day	Died	No change
361	1,820	1 : 2000	Paralysis from 3rd, death on 4th day	Died	H, E and R
362	1,950	1 : 2500	Death on next day	Died	No change
381	2,000	1 : 1000	Free from symptoms	Survival	
382	1,770	1 : 1000	Do.	Do.	
383	1,850	1 : 1250	Do.	Do.	
384	1,850	1 : 1250	Do.	Do.	
385	1,700	1 : 1600	Do.	Do.	
386	1,900	1 : 1600	Paralysis from 3rd, death on 7th day	Died	H and E
705	1,680	1 : 2000	Paralysis from 2nd, death on 3rd day	Died	E
706	1,720	1 : 2000	Death on next day	Died	No change
707	1,800	1 : 2500	Death on next day	Died	E
708	1,550	1 : 2500	Paralysis from next, death on 3rd day	Died	No change
709	1,630	1 : 3000	Paralysis from next, death on 3rd day	Died	E and H, Coccidium
710	1,600	1 : 3000	Paralysis from next, death on 3rd day	Died	E

With 2 cc. of No. 17 toxin (16 × M.L.D.), L + of No. 129 serum was determined.

729	1,600	1 : 800	Free from symptoms	Survival	
730	1,710	1 : 1000	Do.	Do.	
731	1,970	1 : 1250	Do.	Do.	
732	1,810	1 : 1600	Do.	Do.	
733	1,810	1 : 2000	Death on 7th day	Died	No change
734	1,750	1 : 2500	Paralysis from 3rd, death on 5th day	Died	E and H
757	1,750	1 : 2500	Free from symptoms	Survival	
758	1,770	1 : 2500	Death on 2nd day	Died	E and R
759	1,560	1 : 3000	Death on 2nd day	Died	E and H
760	1,910	1 : 3000	Paralysis from 2nd, death on 3rd day	Died	H, E and R
761	1,720	1 : 4000	Death on next day	Died	H, E and R
762	1,770	1 : 4000	Paralysis from next day, death on 3rd day	Died	H and E

PROTOCOL OF CHART IV (*continued*).

With 1 cc. of No. 1 toxin (30 × M. L. D.), L + of No. 128 serum was determined.

Rabbit No.	Body weight in grams	Amt. of Serum	Course	Death or Survival	Autopsy Findings
819	1,880	1 : 1600	Death on 2nd day	Died	H, E and R
820	1,460	1 : 1600	Death on 2nd day	Died	H and E
821	1,580	1 : 2000	Paralysis from next, death on 3rd day	Died	E
822	1,600	1 : 2000	Paralysis from next, death on 3rd day	Died	H and E
823	1,620	1 : 2500	Paralysis from next, death on 4th day	Died	H and E
824	1,710	1 : 2500	Paralysis from next, death on 3rd day	Died	E
848	1,900	1 : 800	Free from symptoms	Survival	
849	1,540	1 : 800	Death on next day	Died	No change
850	1,780	1 : 1000	Paralysis from 2nd, death on 3rd day	Died	H and E
851	1,660	1 : 1000	Death on 4th day	Died	H and E
852	1,780	1 : 1250	Death on 2nd day	Died	H and E
853	1,780	1 : 1250	Diarrhœa from 3rd day, recovery after 7 days	Survival	

With 1 cc. of. No. 1 toxin (30 × M. L. D.), L + of No. 129 serum was determined.

836	1,700	1 : 500	Free from symptoms	Survival	
837	1,700	1 : 500	Death on next day	Died	No change
838	1,680	1 : 800	Paralysis from 2nd, death on 5th day	Died	H and E
839	1,530	1 : 1000	Free from symptoms	Survival	
840	1,630	1 : 1250	Death on 4th day	Died	H and E
841	1,690	1 : 1600	Death on next day	Died	E

D. ANTI-BACTERICIDAL TEST OF DYSENTERY SERUM

Shiga's method of anti-bactericidal test of dysentery serum was followed with mice. It was, however, found difficult to find mice of pure Japanese breed weighing 12 to 14 grams. The European mice imported in 1910 mixed with the Japanese breed, whence the difficulty of finding pure-bred Japanese mice. We therefore used mice looking like the Japanese breed, and weighing 11 to 12 grams. Dysentery bacilli, the lethal dose of which were from 0.2 to 0.4 mg, were used. The Shiga method was to inject into the lower abdominal cavity a mixture of twice the lethal dose of bacilli with test serum after incubation at 37° for 30 minutes, and to examine whether the mice were dead or still living after 24 hours. As the following experimental protocols of the anti-bactericidal tests of dysentery immune horse serum with mice show, immune serum made with agar-culture gave the best results (as in the case of the anti-toxic test), and the immune serum made with bouillon culture the next best, while the filtrated toxin gave the poorest results. These experimental results are in accord with the anti-toxic tests with rabbits.

Protocols on the Anti-bactericidal Test of Dysentery Serum.

E. DISCUSSION ON THE ANTI-BACTERICIDAL TEST OF DYSENTERY SERUM

In carrying out Shiga's method of testing the efficacy of dysentery immune serum, found difficulty in obtaining toxic bacilli. The lethal dose determined by injecting o the abdominal cavity of mice was from 0.3 to 0.4 mg, and bacilli having a lethal dose 0.2 mg were seldom obtainable. Toxicity was not increased by passing through bits many times. (The lethal dose for rabbits was 0.5 mg.)

In our experiments therefore we used twice the lethal dose. Consequently, we met iculties in accurate determination of the results in many cases. There may have n differences in resistance in individual mice. We, however, used a large number mice to obtain as accurate results as possible. We tested how much immune serum required to protect twice the lethal doses, 0.4 and 0.2 of the bacilli. The effective ues of two immune sera tested with two strains of the organisms having different al doses were parallel. The effective values of the immune sera were about ten times longer with strongly toxic strain than weakly toxic strain. (Table.)

According to the foregoing results, Shiga's method of bactericidal test gives different ults with differences in virulency of the bacilli on mice. The immunity unit of the um is higher with twice the lethal dose of strongly virulent strains than weak strains. erefore in carrying out Shiga's method a strain of the bacillus having a certain defie virulency must be selected. It is important to obtain a strain having a certain inite virulency for the test of dysentery serum. This precludes the difficulty of opting Shiga's method for the determination of the immunity unit of dysentery serum.

The bactericidal and anti-toxic values are compared in the following table.

Sera	Bactericidal Value (strain No. 16)	Antitoxic Value (L of 30 times the lethal dose of toxin No. 1)
No. 128.	0.00001	0.001 cc.
No. 129.	0.00005	0.0008 cc.

According to this table, the bactericidal value and anti-toxic value are not parallel. dysentery toxin is an endotoxin, this fact presents complex relation.

The standardisation of dysentery toxin and serum and the test method are included the second report. We have prepared strong anti-toxin serum and are using it clini-ly. The results will be reported later.

e anti-bactericidal tests of dysentery immune horse serum with the filtrated toxin No. 130.

No. of Japanese Breed	Body weight	Test Serum	Dose of Dysentery bacilli. Strain No. 16	Result after 24 hours
824	10 gram.	0.00001	0.4 mg.	Survived
825	»	»	»	»
826	»	»	»	»
827	»	0.000005	»	»
828	»	»	»	Died
829	»	0.0000025	»	»
830	»	»	»	»

The anti-bactericidal tests of dysentery immune horse serum agar-culture.
(*Horse No. 129.*)

No. of Japanese Breed	Body weight	Dose of Test Serum	Dose of bacilli. No. 16	Result after 24 hours
862	10 gram.	0.00005	0.4 mg.	Survived
863	»	»	»	»
864	»	»	»	Died
865	»	0.000025	»	Survived
866	»	»	»	Died
867	»	»	»	»
868	»	0.00001	»	»
869	»	»	»	»

The anti-bactericidal tests of dysentery immune serum with the filtrated toxin No. 130

No. of Japanese Breed	Body weight	Dose of Serum	Dose of bacilli. Strain No. 16	Result after 24 hours
686	10 gram.	0.02	0.4 mg.	Died
687	»	»	»	Survived
688	»	»	»	»
689	»	»	»	»
690	»	0.01	»	»
691	»	»	»	»
692	»	»	»	»
693	»	»	»	»
486	»	0.005	»	Died
487	»	»	»	»
488	»	0.0025	»	»
489	»	»	»	»
490	»	0.001	»	»
491	»	»	»	»

The bactericidal tests of dysentery immune serum with the filtrated toxin.
(*Horse No. 131.*)

No. of Japanese Breed	Body weight	Dose of Serum	Dose of bacilli. Strain No. 16	Result after 24 hours
694	10 gram.	0.02	0.4 mg.	Died
695	»	»	»	»
696	»	»	»	Survived
697	»	»	»	»
698	»	0.01	»	»
699	»	»	»	Died
700	»	»	»	»
701	»	»	»	Survived
492	»	0.005	»	»
493	»	»	»	»
494	»	0.0025	»	Died
495	»	»	»	»
496	»	0.001	»	Survived
497	»	»	»	Died

The bactericidal tests of the dysentery immune horse serum with Bouillon Culture.

(*Horse No. 136.*)

No. of apanese Breed	Body weight	Dose of Serum	Dose of bacilli. Strain No. 16	Result after 24 hours
—	—	—	—	—
702	10 gram.	0.02	0.4 mg.	Survived
703	»	»	»	»
704	»	»	»	»
705	»	»	»	»
706	»	0.01	»	»
707	»	»	»	»
708	»	»	»	»
709	»	»	»	»
498	»	0.005	»	»
499	»	»	»	»
500	»	0.0025	»	»
501	»	»	»	Died
502	»	0.001	»	»
503	»	»	»	»

The bactericidal tests of dysentery immune horse serum with Bouillon Culture

(*Horse No. 137.*)

No. of apanese Breed	Body weight	Dose of Serum	Dose of bacilli. Strain No. 16	Result after 24 hours
—	—	—	—	—
710	10 gram.	0.02	0.4 mg.	Survived
711	»	»	»	»
712	»	»	»	»
713	»	»	»	»
714	»	0.01	»	»
715	»	»	»	»
716	»	»	»	»
717	»	»	»	»
504	»	0.005	»	»
505	»	»	»	Died
506	»	0.0025	»	Survived
507	»	»	»	Died
508	»	0.001	»	Survived
509	»	»	»	»

CONTROL.

510	10 gram.	—	0.2 mg.	Died
511	»	—	»	»
512	»	—	»	»
513	»	—	»	»

The bactericidal tests of dysentery immune horse serum. (*Horse No. 128.*)

No. of Japanese Breed	Body weight	Dose of Serum	Dose of bacilli. Strain No. 33	Result after 24 hours
595	10 gram.	0.02	0.8 mg.	Died
599	»	»	»	»
600	»	»	»	Survived
601	»	»	»	»
602	»	0.01	»	»
603	»	»	»	»
604	»	»	»	»
605	»	»	»	»
329	»	0.005	»	»
330	»	»	»	»
331	»	0.0025	»	»
332	»	»	»	»
333	»	0.001	»	»
334	»	»	»	Died
790	»	0.0005	»	Survived
791	»	»	»	Died
792	»	0.00025	»	Survived
793	»	»	»	Died
794	»	0.0001	»	Survived
795	»	»	»	»
796	»	0.00005	»	Died
797	»	»	»	»
798	»	»	»	»
799	»	0.000025	»	»
800	»	»	»	Survived
801	»	»	»	Died
802	»	0.00001	»	»
803	»	»	»	»
804	»	»	»	»
805	»	0.000005	»	»
806	»	»	»	»
807	»	»	»	»
808	»	0.0000025	»	»
809	»	»	»	»
810	»	»	»	»

The bactericidal tests of dysentery immune horse serum. (*Horse No. 129.*)

No. of Japanese Breed	Body weight	Dose of Serum	Dose of bacilli. Strain No. 33.	Result after 24 hours
—	—	—	—	—
606	10 gram.	0.02	0.8 mg.	Survived
607	»	»	»	»
608	»	»	»	»
609	»	»	»	»
610	»	0.01	»	»
611	»	»	»	Died
612	»	»	»	Survived
613	»	»	»	»
335	11 gram.	0.005	»	»
336	10 gram.	»	»	»
337	11 gram.	0.0025	»	Died
338	10 gram.	»	»	Survived
339	11 gram.	0.001	»	Died
340	10 gram.	»	»	Survived
834	»	0.0005	»	»
835	»	»	»	»
836	»	0.00025	»	Died
837	»	»	»	»
838	»	0.0001	»	»
839	»	»	»	Survived
840	»	0.00005	»	Died
841	»	»	»	»
842	»	»	»	»
843	»	0.000025	»	Survived
844	»	»	»	Died
845	»	»	»	»
846	»	0.00001	»	»
847	»	»	»	»
848	»	0.000005	»	»
849	»	»	»	»
850	»	0.0000025	»	»
851	»	»	»	»
		CONTROL.		
630	10 gram.	—	0.4 mg.	Died
631	»	—	»	»
311	11 gram.	—	»	»
312	»	—	»	»
874	»	—	»	»
875	»	—	»	»

The bactericidal tests of dysentery immune horse serum. (*Horse No. 128.*)

No. of Japanese Breed	Body weight	Dose of Serum	Dose of bacilli. Strain No. 16	Result after 24 hours
670	10 gram.	0.02	0.4 mg.	Survival
671	»	»	»	»
672	»	»	»	»
673	»	»	»	»
674	»	0.01	»	»
675	»	»	»	»
676	»	»	»	»
677	»	»	»	»
754	»	0.005	»	»
755	»	»	»	»
756	»	»	»	»
757	»	»	»	»
758	»	0.0025	»	»
759	»	»	»	»
760	»	»	»	»
761	»	»	»	»
762	»	0.001	»	»
763	»	»	»	»
764	»	»	»	Died
765	»	»	»	Survived
812	»	0.0005	»	»
813	»	»	»	Died
814	»	0.00025	»	Survived
815	»	»	»	»
816	»	0.0001	»	»
817	»	»	»	Died
818	»	0.00005	»	Survived
819	»	»	»	»
820	»	»	»	Died
821	»	0.000025	»	Survived
822	»	»	»	»
823	»	»	»	Died
824	»	0.00001	»	Survived
825	»	»	»	»
826	»	»	»	»
827	»	0.000005	»	»
828	»	»	»	Died
829	»	0.0000025	»	»
830	»	»	»	»

The bactericidal tests of dysentery immune horse serum. (*Horse No. 129.*)

No. of Japanese Breed	Body weight	Dose of Serum	Dose of bacilli. Strain No. 16	Result after 24 hours
678	10 gram.	0.02	0.4 mg.	Survived
679	»	»	»	»
680	»	»	»	»
681	»	»	»	»
682	»	0.01	»	Died
683	»	»	»	»
684	»	»	»	Survived
685	»	»	»	»
766	»	0.005	»	»
767	»	»	»	»
768	»	»	»	»
769	»	»	»	»
770	»	0.0025	»	»
771	»	»	»	»
772	»	»	»	»
773	»	»	»	»
774	»	0.001	»	»
775	»	»	»	»
776	»	»	»	Died
777	»	»	»	Survived
856	»	0.0005	»	»
857	»	»	»	»
858	»	0.00025	»	»
859	»	»	»	Died
860	»	0.0001	»	Survived
861	»	»	»	Died
862	»	0.00005	»	Survived
863	»	»	»	»
864	»	»	»	Died
865	»	0.000025	»	Survived
866	»	»	»	Died
867	»	»	»	»
868	»	0.00001	»	»
869	»	»	»	»
CONTROL.				
876.	11 gram.	—	0.2 mg.	Died
878	»	—	»	»
634	10 gram.	—	»	»
635	»	—	»	»
750	»	—	»	»
751	»	—	»	»

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February 15th, 1924.

HEALTH ORGANISATION

HE PROPHYLAXIS OF DIPHTHERIA

BY THE

DETERMINATION OF SUSCEPTIBLES

AND THEIR

ACTIVE ARTIFICIAL IMMUNISATION

IN THE UNITED STATES

BY

Dr Louis VAN BOECKEL

Director of the Laboratory of the Belgian Public Health Department.

1924

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Active Artificial Anti-Diphtherial Immunisation.

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Popularisation of Active Immunisation against Diphtheria

General Conclusions.

INTRODUCTION

The discovery of the diphtheria bacillus by Löffler [157] (*) in 1884 and of the anti-toxin diphtheria by von Behring and Kitasato [29] in 1890 and the application of anti-diphtherial serotherapy by Roux in 1894 gave rise to the belief that, in addition to the ordinary means of prophylaxis, we possessed for the campaign against diphtheria special weapons capable of eliminating it from the table of morbidity of civilised countries.

However fortunate the influence of the discovery of the Löffler bacillus may have been on the prophylaxis of diphtheria by enabling the vectors of contagion and, in particular, the healthy carriers of bacilli to be tracked down, and however noticeable the diminution in diphtheria morbidity and mortality may have been under the influence of specific treatment and the passive artificial immunisation of contacts, diphtheria remains a disease of frequent occurrence and of serious character.

After 25 years of effort, diphtheria morbidity has been reduced in the United States and in other countries by only one-third [222], and the fatality, although diminished by six-tenths [222], still amounts to approximately 8 per cent [315].

The following tables show that in the last few years anti-diphtherial prophylaxis appears to have reached its maximum efficacy, for morbidity and mortality remain stationary.

DIPHTHERIA MORTALITY PER 100,000 INHABITANTS OF THE UNITED STATES (1)

Year		Year	
1900	40.4	1918	16.4
1910	22.5	1919	17.7
1911	18.5	1920	17.4
1912	16.8	1921	17.9
1913	18.2	Returns for New York State.	
1914	18.4	1908	28.2
1915	15.8	1921	16.1
1916	15.1	1922	13.6
1917	18.2		

(*) The numbers refer to the Bibliography; the figures in parentheses refer to the footnotes.
(1) Official statistics of the Federal Government.

NUMBER OF CASES OF DIPHTHERIA NOTIFIED, NUMBER OF DEATHS, NUMBER OF CASE PER 1,000 INHABITANTS, NUMBER OF DEATHS PER 100 CASES AND NUMBER OF CASES NOTIFIED PER FATAL CASE IN A RECENT YEAR (1).

Locality	Cases notified	Deaths recorded	No. of cases per 1,000 inhabitants	No. of deaths per 100 cases	No. of cases notifie per fatal cas
Boston, Mass.	4,098	276	5,337	6.73	15
Cincinnati, Ohio	814	47	1,965	5.77	17
Denver, Col.	404	20	1,505	4.95	20
Detroit, Mich.	4,477	409	7,227	9.14	11
New Orleans, La.	873	32	2,316	3.67	27
San Francisco, Calif.	860	68	1,826	7.91	13

NEW YORK CITY (2)

Year	Morbidity	Mortality
1913	14,535	1,333
1914	17,129	1,491
1915	15,259	1,278
1916	13,521	1,031
1917	12,624	1,158
1918	12,455	1,245
1919	14,914	1,239
1920	14,966	1,045

DIPHTHERIA (3)

Towns	1921					1922				
	Population	No. of cases	Cases per 100,000	De-aths	Deaths per 100,000	Population	No. of cases	Cases per 100,000	De-aths	Deaths per 100,000
Baltimore	752,865	1,423	189.14	89	11.82	762,222	1,531	200.86	93	12.20
Los Angeles	611,921	2,842	464.43	85	13.89	634,866	2,486	391.57	97	15.27
New York	5,751,867	15,110	262.69	891	15.49	5,839,746	10,427	178.55	875	14.94
Philadelphia	1,866,212	3,382	181.22	323	17.30	1,894,500	3,069	161.99	281	14.83
St. Louis	786,164	3,584	455.88	143	18.18	795,008	1,814	226.91	62	7.79
Boston	757,634	2,992	394.91	148	19.53	764,017	2,992	391.61	143	18.71
Cleveland	831,138	1,788	215.12	170	20.45	854,565	1,802	210.86	131	15.32
Pittsburg	602,452	1,633	271.05	131	21.74	607,902	1,321	217.30	108	17.76
Chicago	2,780,655	9,313	334.92	683	24.56	2,833,288	7,363	259.87	559	19.72
San Francisco	520,546	1,712	328.88	141	27.08	529,792	1,655	312.38	119	22.46
Buffalo	519,608	1,960	277.20	148	28.48	528,163	775	146.73	69	13.06
Detroit	1,070,450	4,689	438.04	334	31.20	993,678	2,779	279.66	204	20.52

(1) ROSENAU, M. J.: *Preventive Medicine and Hygiene*, 1921.
(2) Official statistics.
(3) Tables received from Dr. JONES, Head of the Public Health Service in Baltimore.

These results need not surprise us.

The reasons for the incomplete success of anti-diphtherial prophylaxis are many.

Bacteriological examination does not enable all cases of diphtheria or all carriers to .. discovered. A negative finding does not necessarily imply the absence of Löffler .ıcilli. A certain number of diseased or healthy carriers continue to propagate the ,sease without the knowledge of the various health services.

In endemic areas from 0.1 per cent to 5 per cent of the population are healthy carriers . virulent Löffler bacilli. In order to discover them, it is necessary, at repeated intervals, take swabs of the nose and throat; but that is often impossible.

When germ-carriers have been discovered, we have to determine whether or not they 'e carrying virulent germs, as it would be illogical and unjust to restrict the freedom of ovement of persons who are not dangerous to the community.

The determination of the virulence of the bacilli is, however, a long and arduous .sk — that is to say, it is not a practical expedient. Moreover, we are not in a position) isolate the carriers as strictly as modern prophylaxis requires, nor can we rid them of ıeir germs by easy and certain methods.

Apart from many other considerations, the fear of anaphylactic (1) accidents tends, e fancy, and with some semblance of reason, to restrict the employment of the serum ır the passive immunisation of persons exposed to contagion.

It is not surprising, therefore, that diphtheria *morbidity* remains high. Nor is it ;tonishing that the *mortality* remains at a high level, in spite of the ascertained efficacy ! the serum treatment, if we consider that the disease too often passes unrecognised or is ;cognised too late for the patient to be saved by the specific serum.

We know indeed that the anti-toxin rapidly neutralises the toxin circulating in the lood but that it does not have much effect on the toxin embedded in the tissues.

Moreover, the doctor too often does not inject a sufficient quantity of serum to neu-'alise all the circulating toxin and to stop or inhibit the proliferation of the bacilli on ıe mucous membranes.

These considerations explain the partial failure of anti-diphtherial prophylaxis and ıake us welcome the introduction of a new method of prophylaxis: active artificial nti-diphtherial immunisation. We are still, however, convinced — in spite of the claim dvanced in certain quarters — that the means we have hitherto had at our disposal for

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(1) Rosenau and Anderson* state that they have collected from the literature 19 cases of sudden eath resulting from an injection of anti-diphtherial serum, and they state that they are acquainted ith several other cases which have not been published.

Some of the deaths were of persons who suffered from asthma, or who experienced a malaise when ı the presence of horses.

Cases of deaths caused by the injection of serum into persons who have been previously sensitised 'ould appear to be rare. We are, however, acquainted with one case of death resulting from the injection f anti-diphtheritic serum into an adolescent who had been sensitised in early childhood by means of nti-tetanic serum, and we have observed several other cases of anaphylactic shock in the case of persons ensitised by a previous injection of serum.

* Rosenau, M. J.: *Preventive Medicine and Hygiene*, 1921.

combating diphtheria, viz. the discovery, isolation and disinfection of diseased and heal
carriers, the specific treatment of persons suffering from the disease, the passive artifi
immunisation of contacts, epidemiological investigation, prophylaxis in schools, med
supervision and the education of contacts in matters of hygiene, have not given as sa
factory results as might have been expected.

In particular, we are convinced that serum treatment ought to lead to still m
brilliant results than those so far recorded. As soon as the public is sufficiently educa
in matters of hygiene to realise that it is worth while consulting a doctor if there is
least sign of a suspicious inflammation of the throat or nose, so that the latter may ap
prevention rather than cure, and as soon as doctors inject the serum into all pers
suspected of the disease at the earliest moment and do not hesitate to administer
necessary, strong doses in the manner best calculated to produce a rapid effect [1],
will be possible to record a further fall in diphtheria mortality.

The observations of Carey [57], [315] support our thesis.

In examining the causes of a thousand deaths from diphtheria in the State of Mas
chusetts, he discovered that 31.5 per cent of deaths occurred in the case of persons w
had been ill for more than a week before a doctor was called in, that 19.3 per cent of t
patients who died were *in extremis* when the doctor arrived and that 7.6 per cent occurr
among persons in whose cases the disease had only been recognised at a late stage.

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[1] The Schick test has shown that a dose of serum from 10 to 20 times higher must be administer
subcutaneously in order to produce the same anti-toxic effect as a dose administered intravenously.

DETERMINATION BY THE SCHICK TEST OF THE SUSCEPTIBILITY OF INDIVIDUALS TO DIPHTHERIAL INTOXICATION

Historical Survey.

A hundred years ago Trousseau [297] expressed the opinion that certain individuals were naturally immune to diphtheria.

Some 20 to 25 years ago, Abel [1], Wassermann [307] and others [159, 206, 280] demonstrated that the blood of certain individuals naturally contained substances which neutralised diphtheria toxin.

In 1904, Marx [170] noted that an infinitesimal dose of diphtheria toxin, when injected subcutaneously into a guinea-pig, produced a more or less violent reaction, but that this did not occur if, simultaneously or shortly beforehand, the guinea-pig was injected with serum taken from certain healthy individuals.

Römer [262], who had observed that the intracutaneous injection of diphtheria toxin also produced a reaction in the guinea-pig, demonstrated in 1909, with Sames [263] and Smoggi [264], that the injection of serum taken from certain individuals prevents such reaction from taking place.

Schick [270, 273, 276] and his collaborators, in 1911, noted that Römer's intracutaneous reaction could be used in the case of man to determine roughly the degree of susceptibility of the organism to diphtheria toxin.

In 1912, Schick, with Michiels [176, 177], described a practical method of diagnosing the susceptibility of the individual to diphtheria.

We are indebted to Park's laboratory in America for having brought out the full value of the Schick test for the prophylaxis of diphtheria. We are particularly indebted to it for having put into practice a simple and harmless method of actively immunising susceptibles against intoxication by Löffler's bacillus.

The Schick Test.

Experimental Basis.

Since the end of the last century it has been known that the injection of diphtheria toxin has an irritant action on the tissues of the organism, and in the case of considerable

doses injected into or under the skin, the tissues react locally by specific manifestatio leading to the formation of a dry crust. If the toxin is neutralised *in vitro* by the an toxin, or if such neutralisation takes place in the organism itself, owing to the presence antitoxin in the blood, the injection produces no reaction.

Between 1911 and 1913 Schick [176, 177, 276, 277, 278] and his collaborators demonstrate not only that the presence in the blood of a human being of 1/30th part of an antitox unit per c.cm. rendered the subject refractory to diphtheria intoxication but also th this quantity neutralised 1/50th part of the minimum lethal dose of toxin injected int the skin, so that no reaction occurred.

These are the experimental data upon which the Schick test is based. The test mak it possible to determine the state of the individual's susceptibility to diphtheria, by findin out how the organism responds to the intra-dermal injection of a fixed quantity of toxi suitably diluted.

If the organism reacts locally to the injection of 1/50th (Schick) or 1/40th (Par and Zingher) (1) M.L.D. (2) of toxin, the individual may be regarded as susceptible t diphtheria; his blood contains less than 1/25th (Wæver and Rappaport [310]), 1/30t (Schick [176]) or 1/40th (Kolmer and Moshage [138]) of an antitoxin unit per c.cm. If th blood contains more than this, the subject does not react; he is immune.

Observations made, at Park's instance, in the United States, on about 500,00 subjects, entirely confirm Schick's hypothesis, as will be seen when we discuss the valu of the Schick reaction.

Park [220, 222] thinks we are entitled to believe that a person who possesses sufficien antitoxin to give a negative Schick reaction is incapable of contracting diphtheria toxæmi or serious infection with Löffler's bacillus. It is open to doubt whether such subjects ar liable to a purely local diphtherial infection of the mucous membranes.

Park considers that the cases of apparent diphtheria infections met with in person who give a negative Schick reaction are generally of a streptococcal nature and that th diphtheria bacillus found in such cases merely plays the part of a saprophyte. Subject who give a slight positive Schick reaction may contract localised diphtheria infection.

All the health authorities consulted by us on the Schick test during our travel in th United States agree that it is of great value. As the test is of a biological character, som naturally regard it with greater favour than others.

Choice of the Toxin for Schick Test.

Up to the present, diphtheria toxins have not been obtainable in a pure state; they have always contained a certain quantity of protein material originating in bacterio-lysis

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(1) Zingher [321] prefers 1/40th M.L.D. in order to obtain a definite reaction.
(2) M.L.D. = minimum lethal dose of diphtheria toxin for a guinea-pig weighing 250 grams.

om the culture medium. When these foreign albumins are introduced into the es, they cause, in susceptible subjects, a protein reaction, which may easily be mis- n for the toxin reaction (1).

It would appear, therefore, that, for the Schick test, a toxin should be employed h contains as few foreign substances as possible. This requirement is fulfilled if a active toxin is used, the minimum lethal dose of which contains an infinitesimal tity of such substances (2). But, unfortunately, it is not easy to measure with ient accuracy a dose fulfilling these conditions and which is to be used for a limited ber of tests. In order to overcome this difficulty, it is necessary, therefore, to dilute oxin in glycerine (50 per cent).

With White (3), we may ask whether it would not be better to employ, for the k reaction, a toxin which is not too active, is more easily measurable and is capable of ing a slight protein reaction in susceptible individuals, which would serve as a sort of e for the reactions which subjects may subsequently show when being actively unised with a mixture of toxin and antitoxin. Observation has indeed shown that ns who react most strongly to the T.A. (4) injection are precisely those who give a in reaction when injected with a diphtheria toxin. In the light of the experience d by the Schick test, we may inject the T.A. mixture into these individuals in frac- l doses, thus avoiding unpleasant reactions.

Supply of Re-agents for the Schick Test, and their Preparation.

The toxin dilution for the Schick test should be prepared as it is required, since theria toxin rapidly deteriorates when diluted.

The various laboratories in the United States — those of New York City, Massachu-, Gilliland, Mulford & Co., Parke Davis, etc., for example — supply the products he Schick reaction in cases which contain:

(1) a phial or a capillary tube, containing an accurately measured quantity of pure toxin;

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(1) In order to avoid such errors in interpreting the reaction, it is usual, when carrying out the Schick to make, at the same time as the toxin injection, a control injection with toxin broth which has heated to destroy its toxicity, *i.e.* a product containing all the accompanying proteins without ue toxin, which makes it possible readily to distinguish between the specific toxin reaction and the ary protein reaction.

(2) It will perhaps be as well to point out that the minimum lethal dose of diphtheria toxin is repre- d by fractions of tenths, and sometimes of thousandths, of a c.cm. The quantity to be injected is '50th part of this dose. It is not, therefore, measurable for practicable purposes. In order to ome this difficulty, laboratories are often obliged to furnish phials containing a number of doses er than that which the practitioner requires. It must not be imagined that the cost of the product reby increased. As Park points out, it is neither the product nor its packing which are costly, its preparation.

(3) Verbal communication.

(4) T. A. = Mixture of toxin and antitoxin.

(2) a phial containing the exact quantity of physiological saline required to d
the toxin;

(3) a second phial or capillary tube containing heated toxin for the control inject

(4) a second phial of physiological saline for the dilution of the heated toxin.

The heated toxin is often supplied in solution, ready for use.

The tubes and phials are distinguished either by labels or by coloured marks.

The quantity of toxin contained in the phial or capillary tube corresponds to
number of doses indicated on the label (1).

As the toxin deteriorates more or less rapidly, the laboratories are required to
a slightly larger quantity into the receptacles.

Just before use, in the case of the phial packages, the saline solution is removed fr
the diluant phial, usually by means of a syringe, and added to the toxin phial, in wh
the dilution is thoroughly mixed by shaking.

In the case of the capillary tube packages, the tube is broked at both ends, accord
to the instructions which accompany the product.

The liquid is ejected from the tube into the phial of physiological saline by me
of a small india-rubber bulb affixed to one of the extremities. In order that no toxin m
be lost, the receptacle is thoroughly cleared by inflating and deflating the india-rub
bulb several times.

Park now dispenses with this repeated washing-out process by inserting in te
capillary tube, at the end to which the india-rubber bulb is affixed, a paraffin plug, wh
expels the liquid. By bringing the other end of the capillary tube into contact with te
physiological saline, it is possible, by simply pressing the bulb, to eject the ente
quantity of toxin without any loss whatever.

As the toxin rapidly deteriorates in saline solution, the solution should be employ
within six hours.

The heated toxin is diluted in the same way as the pure toxin, unless the product
supplied in solution.

Zingher[355] suggests that the dose of heated toxin to be injected should be 20 per cet
stronger than the dose of toxin, because heating destroys about one-quarter of the prote
contained in the product.

The various authors hold different opinions as to the quantity of solution to
injected. When carrying out their first experiments, both Schick and Park (2) dilut
the toxin in such a way that the dose to be injected, 1/50 M.L.D., was contained in 1/
of a c.cm. of the solution. Most American hygienists have adopted this method. Park
himself has slightly modified his procedure and now injects 1/40 of an M.L.D. diluted

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(1) In order to prevent serious accidents from mistakes in dilution, no packages are permitted in int
State commerce which contain more than 100 human test doses (2 M.L.D. for guinea-pigs).

(2) According to enclosed instructions.

1 of a c.cm. of physiological saline. He considers that this produces a reaction h is less violent though sufficiently definite.

Control of Products (1).

The toxins for the Schick reaction are controlled at the Hygienic Laboratory of the . Public Health Service.

Specimens of each portion of toxin must be forwarded for examination, and the por- concerned can only be put into circulation if it has given satisfactory results.

The minimum lethal dose M.L.D. of diphtheria toxin for the Schick reaction is defined e minimum quantity of toxin which, when diluted to a volume of 3 c.cm. and injected r the skin of guinea-pigs weighing 250 to 280 grammes, occasions the death, in less 96 hours, of 75 per cent of the guinea-pigs, with lesions typical of pure diphtheritic cication.

Each Schick test equipment case must contain a tube with diphtheria toxin and a l of physiological saline for solution.

The other regulations are:

Total number of human doses	10 to 100 per package.
Quantity of toxin per human dose and volume of human dose when diluted	1/50 M.L.D. in 0.1 c.cm. of physiological saline or 1/40 M.L.D. in 0.2 c.cm.
Volume of pure toxin	not more than 0.2 c.cm. per M.L.D.

The receptacles employed must be such that they can be filled with absolute precision emptied completely from the receptacles without any risk of contaminating the uct.

The toxin receptacles must bear a label showing the number of human doses, and the l containing the diluent must bear an indication of the volume of the dilution to be ted, and the equipment case must contain instructions regarding the method of dilu-

Both the pure and diluted toxin must be sterile.

It will be seen that the regulations of the U. S. Public Health Service are designed only to compel the manufacturers to supply a product which fulfils all the required litions but also to prevent any risk of infection or accidental intoxication. As the of toxin cannot contain more than 100 human doses, *i.e.* 2 or 2.4 M.L.D. for a guinea- the injection by accident of the whole of the contents cannot cause the death of a l weighing 10 kilos, inasmuch as the minimum lethal dose for children is, according esults of American research, at least 10 M.L.D. for a guinea-pig.

The equipment cases for the Schick test must bear the inscription "Diphtheria n for Schick test".

(1) Instructions of the United States Public Health Service.

Technique.

For the Schick test, the toxin should be injected into the dermis.

In order to carry out intra-dermal injection without difficulty, use should be m of a short, fine, non-flexible needle of iridium-coated platinum or steel; a short but sl level-edged point is better than a long and tapering point.

Any glass or glass-and-metal syringe, which can easily be sterilised and is divided tenths of cubic centimeters, may be employed.

There now exist on the market special equipment cases for the Schick react containing two fine syringes with clearly marked graduations and suitable need The one is used for the injection of the toxin and the other for the control injection.

The most satisfactory syringe in our opinion is the one which has been manufactu by the Boston Health Service. It bears at its extremity a device whereby it can be fi firmly between the index and middle fingers in such a way as to facilitate its introduct into the skin, to prevent its slipping and to leave the thumb free for bringing the pis into action when the needle has been inserted. The movement is thus simplified.

In order to carry out the injection with an ordinary syringe, the syringe must held between the thumb above and the index and middle fingers below. In order to the piston in motion, the fingers must be displaced so as to give free play to the thu — which complicates the movement.

Disinfection of Instruments.

It is obvious that the instruments — the syringe and needle — which are used the injection must be most carefully sterilised. We do not, however, think that it necessary to sterilise the instruments by boiling them. We all know from experience t disadvantages of this method: the breaking of the glass cylinder of the syringe, the cloggi of the piston owing to precipitation of calcium salts in the water, the blunting of t needle-point and, above all, the length of the operation.

Sterilisation by 60 per cent alcohol would seem to be the best method (1).

It is not necessary when several injections are carried out consecutively to change t needle for each subject. It is sufficient, after each injection, to dip the point of the nee in the alcohol or to wipe it with a plug of cotton wool saturated with alcohol (hundreds thousands of injections have been carried out in this way by the various health servic in the United States, without causing any infection). Our collaborators (and we ourselv have carried out more than 15,000 injections in Belgium with equal success.

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(1) It has been proved by experiment that the maximum sterilising action of alcohol is attain with a 60 per cent concentration.

Injection.

The injection is made in the middle of the front of the forearm at an equal distance m the elbow and the wrist.

The point where the inoculation is made should be disinfected preferably with alcohol. Tincture of iodine, which makes the skin yellow and causes a slight erythema in the e of sensitive subjects, may more or less obscure early reactions.

The operator takes hold of the middle of the subject's forearm with his left hand, cing the palm of his hand at the back of the arm. With the thumb on the one side and forefinger on the other, he then gently stretches the skin of the front of the forearm l the injection is made.

In order to carry out intra-dermal inoculation without difficulty, the following cedure is adopted: the needle is fixed on the syringe in such a way that its eye is on graduated side of the syringe. The syringe is held with the graduated side uppermost, ıost parallel to the surface of the skin.

The point of the needle is slowly driven into the dermis in such a manner that its ning may be seen through the epidermis. As soon as the eye of the needle is completely ible the toxin is slowly injected.

The resistance which is experienced in injecting the toxin shows that the dermis has n reached; the appearance of a small, white, circular, and sharply defined swelling the epidermis, which exhibits clearly the openings of the mobile glands in the skin, which only disappear in the course of some half an hour, proves that the operation been successful.

During the injection, and for some time after, the subject experiences a burning sation at the point where the inoculation was made.

As soon as the dose has been injected, the needle is swiftly withdrawn. If care has n taken to use a fine needle, the quantity of liquid which exudes from the puncture insignificant.

The control injection with heated toxin is carried out in the same manner on the other n.

The Schick test can be applied to a series of 150 to 200 subjects per hour if two tors, a nurse and a clerk are employed and if order and discipline are enforced.

The candidates enter in single file at one side of the room with their forearms uncov-d. The nurse disinfects the site where the inoculation is to be made and the subject vances towards the two doctors, one of whom inoculates one arm with the solution oure toxin while the other inoculates the other arm with the heated toxin.

In order to reduce the pain of the puncture to a minimum, it is advisable to inoculate h arms simultaneously and to distract the attention of the subject from the injection questioning him, for example, as to his name, age, etc.

Positive Reaction.

If the blood of the injected person contains less than 1/30th of an antitoxin unit per m., the toxin introduced into the derm is insufficiently neutralised; it therefore

exercises an irritant action on the tissues. The latter then respond with an inflamm reaction which appears after 12 to 36 hours, and takes the form of infiltration and re round the site of inoculation.

The reaction, which is clearly visible towards the end of the second day, incr progressively in intensity and attains its maximum after from three to five days; it disappears slowly, leaving behind it a brown patch which desquamates in fine fl and does not finally disappear till after from three to six weeks, and sometimes much l

The reaction zone is generally from 1 to 2 cm. in diameter and is very rarely pai

The intensity of the reaction varies according to the susceptibility of the sub being inversely proportional to the quantity of antitoxin present in the blood of injected person.

Thus, in the case of a person who does not possess antitoxin at all, small vesi or a slight necrosis of the upper strata of the epithelium, may appear at the site of inoc tion; in the case of a person, however, who partially neutralises the injected toxin, reaction is only slight.

Negative Reaction.

A subject possessing sufficient antitoxin to neutralise the toxin completely does show any local reaction, and we may at most note in such a case the traumatic le caused by the needle at the site of injection.

Protein Reaction.

If an injected subject is susceptible to the proteins of the solution, he will react inoculation by manifestations of an urticarial character.

This protein reaction appears and disappears more rapidly than the specific to reaction.

It is apparent from 6 to 18 hours after the injection, reaches its maximum afte day or a day and a half, and disappears after three or four days, leaving only a sligh pigmented zone, which as a rule does not desquamate.

Weak protein reactions resemble the positive reaction after 24 hours. Those wh are intense show a much wider zone of infiltration, with a dark red central area surrounc by a bright red areola growing fainter towards the periphery.

It goes without saying that the protein reaction may occur in the case of a susceptil subject just as much as in the case of a subject who is refractory to the diphtheria tox — in other words, it may take place in the case of a person giving a positive Schick reacti as easily as in the case of a person giving a negative reaction.

In the case of a subject susceptible to the diphtheria toxin, a protein reaction tak place in addition to the toxin reaction; there is thus a combined reaction; in the case of immune subject, the protein reaction is seen in its pure state; it then constitutes a pseu reaction.

Pseudo Reaction.

In order to differentiate the pseudo reaction from the positive reaction, the reaction omena must be observed for at least five days. After five days a pseudo reaction have disappeared, leaving only a patch of brownish pigmentation, whereas a positive ion will still be in full course of development and will show a circumscribed area of se redness growing duller towards the periphery. This redness will then change y and gradually into a finely desquamating brown pigmentation.

Combined Reaction.

The combined reaction — that is to say, due to both toxin and protein — which ars in the case of a subject susceptible to the diphtheria toxin as well as to the proteins e solution, possesses alike the characteristics of the positive reaction and those of the do reaction.

The infiltration and redness are more marked and more extensive after 24 hours than e case of the pure positive reaction. The persistence of a brownish circumscribed which desquamates in fine flakes after the urticarial manifestations have disappeared, ally gives ground for assuming the existence of a combined reaction.

In short, the differential diagnosis of the toxin reaction and the protein reaction h we have just described is always somewhat uncertain and can only be made after ul, repeated and prolonged observation. We possess, however, a sure, easy and method of determining the reaction by administering, simultaneously with the injection, a control injection of toxin which has been heated for five or ten minutes per-neutralised. Heating to 75 degrees destroys the toxin without substantially [illegible] the products resulting from the autolysis of the bacillus. (The addition of [illegible]duces the same effect, but adds the complicating serum proteins.) The ol injection should preferably be made into the other arm. It is chiefly necessary e case of adolescents and adults, who, as we see, react more frequently than children e proteins of diphtheria cultures.

A comparison between the reactions on the two arms makes it possible to differentiate out difficulty between the protein and toxin origin of the cutaneous manifestations. If the reaction is negative, the skin exhibits no peculiarities on either arm; if there is a lo reaction, the redness and infiltration are identical on the two arms and disappear ltaneously after three days, leaving only a small, irregular and indeterminate zone mentation which does not generally desquamate. If the reaction is positive, the ss is only seen in the neighbourhood of the inoculation with non-heated toxin; combined, it shows on the side of the pure toxin inoculation an inflammatory control which develops and disappears slowly and is contained within a reaction zone present- ne same characteristics, and evolving in the same manner, as the reaction which has oped on the other arm in the neighbourhood of the heated toxin inoculation.

It will be seen from what we have said with regard to the characteristics and evolu of the reactions that the reading of the Schick test should be carried out after thre four days. If the subjects are young and a control injection is made, satisfactory res may, however, according to Zingher's[323] observations (1), be obtained even after 24 h in 95 per cent of the cases.

To sum up, inoculation with diphtheria toxin by the Schick method leads, in the of diphtheria susceptibles, either to a pure toxin reaction or a positive reaction, or toxino-protein reaction or combined reaction. Immunes do not react at all, or only r to the proteins of the solution, in which case they give a negative reaction or a pse reaction.

Contra-Indications.

There do not seem to be any contra-indications to the Schick test; it may be app without danger even in the case of sick persons.

Value of the Schick Test.

The test is only of value if the toxin used has been very accurately dosed, has b freshly diluted and has been suitably injected into the dermis and if the reaction has b correctly interpreted.

The dose of toxin to be injected is from 1/40th to 1/50th M.L.D. Park [339] has sho by experiment that the variations of toxicity of 25 per cent in either direction are maximum that may be tolerated.

In animals, the value of the Schick test has been established by experiment.

In man, Guthrie, Marshall and Moss[104] have proved its value by experiment.

They isolated virulent Löffler bacilli taken from the throats of carriers and inocula them into the throats of eight persons who voluntarily submitted themselves to t experiment.

Among these persons, four gave a negative Schick reaction and the other four g a positive reaction. It was only in the case of the latter that diphtheria developed — a a short period of incubation.

Epidemiological data also demonstrate the utility of the Schick test for the purp of anti-diphtherial prophylaxis.

1. Among hundreds of thousands of United States citizens who gave a negat Schick reaction, not a single case of toxæmic diphtheria has been observed.

Among 57,000 New York school-children who gave a negative Schick reacti Park[220] has only noted five cases of clinical diphtheria, whereas 56 cases occurred am 90,000 other children who were examined for the purposes of comparison.

The health authorities of Baltimore, Philadelphia, Virginia and Chicago, whom I v able to consult, testify to the same results.

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(1) Park and Zingher now call the protein reactions pseudo negative, or false negative, and combi positive, in order to avoid any confusion.

2. Bundesen [52], Linenthal, Rubin [154], and others in the United States; Armand Delille, Marie[7], Mery, Guinon and Marie[175] in France, and my colleagues in Belgium, have stopped epidemics by adopting prophylactic measures solely in the case of persons giving a positive Schick reaction.

3. It has been observed on numerous occasions that, of individuals living in diphtheria-infected surroundings, only Schick positives contract the disease.

Park[219], in particular, has, in the course of five years, had 10,000 children suffering from scarlatina under observation in the Willard Parker Hospital for Infectious Diseases. No case of diphtheria ever developed among those giving a negative Schick reaction, whereas, out of 300 scarlatina cases giving a positive Schick, 42 contracted diphtheria.

4. Although cases of diphtheria are frequently observed among carriers of Löffler's bacillus, no case has ever been noted amongst those carriers who give a negative Schick reaction.

Graef and Ginsberg[98], among others, observed no case of diphtheria at the Lincoln Hospital among eleven carriers giving a negative Schick reaction, whereas five persons living in the same surroundings but giving a positive Schick reaction developed diphtheria.

Park discovered among the 1,200 scarlatina cases in the Parker Hospital that 20 per cent were carriers of virulent germs. Diphtheria developed only among those who gave a positive Schick reaction.

In Europe, identical observations have been made.

Renault and Levy[250], as well as others, have observed in Paris, among 39 carriers of virulent germs, 10 cases of diphtheria occurring in 14 individuals who gave a positive Schick reaction; but they did not observe a single case among the 25 others who gave a negative Schick reaction.

5. Park [219] in the United States, Renault and Levy [250], Armand Delille and Marie [7] in France, being convinced that persons who give a negative Schick reaction cannot contract diphtheritic toxæmia, refrain from injecting anti-diphtheria serum into persons giving a negative Schick reaction who contract a suspicious inflammation of the throat with Löffler's bacilli. They note that such cases always recover.

It is true, as de Lavergne and Zœller [143] have observed, that post-diphtherial paralysis has occurred in the case of certain individuals who gave a negative Schick reaction after recovering from diphtheria, but this fact does not detract from the value of the reaction, as it may be assumed that the antitoxin developed in their tissues only after the toxin had already attacked the nerves.

The Schick test has made it possible to carry out numerous biological investigations and to confirm by experiment the principal epidemiological data which it had been possible to establish by careful observation of diphtheria cases. These data concern, in particular, individual susceptibility to diphtheria, according to age, sex, social environment, race, present or former infection, and artificial immunity.

We will now summarise these data.

Susceptibility to Diphtheria according to Age.

The statistics for New York City, which relate to thousands of individuals, are as follows:

Schick Reaction in the Case of Infants and Children under School Age.

1. Infants under six months (Park [220]);

Under three months	15% susceptibles.
From three to six months	30% »

2. Infants aged from six months to one year in the "baby health stations" and "playgrounds" of Manhattan and Bronx (New York) (poorer classes) [339].

Age	Number of Infants examined	Percentage of positive Schick reactions
6–7 months	53	56.6
7–8 months	41	63.4
8–9 months	62	83.8
9–10 months	58	93.1
10–11 months	61	87.0
11–12 months	34	91.1

3. Children from one to six years of age in the same institutions (poorer classes) [3

Age	Number of Infants examined	Percentage of positive Schick reactions
1–3 years . . .	1,727	83.2
4–6 years . . .	1,328	58.6

4. School-children of the New York (Manhattan and Bronx) mixed schools [3

Age	Number of Children examined	Percentage of positive Schick reactions
5–6 years . . .	4,809	60.3
6–7 » . . .	13,754	50.4
7–8 » . . .	16,180	43.5
8–9 » . . .	17,136	36.6
9–10 » . . .	18,065	32.2
10–11 » . . .	18,057	29.3
11–12 » . . .	17,994	28.2
12–13 » . . .	16,254	26.6
13–14 » . . .	14,138	23.1
14–15 » . . .	9,650	19.7
15–16 » . . .	4,861	17.8
16–17 » . . .	369	18.4
	151,261	32.9

5. Adults in a lunatic asylum [339].

Age	Number of Persons injected	Percentage of positive Schick reactions
10–12 years . . .	168	14.2
20–30 » . . .	1,253	12.2
30–40 » . . .	1,488	10.6
40–50 » . . .	1,220	7.8
50–60 » . . .	920	6.4
60–70 » . . .	662	4.9
70–80 » . . .	181	4.9
	5,892	8.5

Susceptibility to diphtheria, which is slight during the first six months after birth, i more pronounced in children aged between six months and one year. At this age sceptibility is at its highest; it is an almost general condition (91.1 per cent). It contines to be very strong until the age of three years and then diminishes progressively in decreasing ratio as the child grows older.

It reaches 60 per cent among children just going to school in densely populated towns, bt drops to about 20 per cent at the age when they leave school. In rural districts, it fquently attains 80 per cent when children enter school and only falls to 40 per cent wen they leave.

If susceptibility is weak up to the age of six months, this is because the child at the ne it is born possesses an inherited passive immunity. The maternal antitoxin is circuling in its blood.

The Schick test has indeed shown that the child possesses up to this period the same i-diphtherial immunity as its mother, and, as we have seen, most adults are naturally ractory to diphtheria.

Immunity from the mother gradually weakens and completely disappears towards l age of three. In addition to this immunity, the child possesses an inherited immunity amily origin, derived half from the family of the father and half from that of the mother. Is immunity persists through life.

Under the influence of contact with Löffler's bacillus the individual develops, in the rse of his existence, sooner or later and with varying rapidity (this fact, as we shall see, been demonstrated by the Schick test), his natural active immunity against diphtheria.

It is interesting to note at this juncture that the child does not inherit any susceptiity to the proteins of diphtheria toxin.

We see, then, that it has been possible to prove by experiment facts which have long e been demonstrated by the statistics of morbidity.

Diphtheria is of very rare occurrence at the beginning of life and in mature age. s frequent among children, but rare among adolescents and adults.

It should be noted that diphtheria assumes its most severe form at the age of gre susceptibility. The following table proves this:

Deaths from Diphtheria in New York during 1917 [220].

Age	Percentage of dea
Under 1 year	11
1 to 4 years inclusive	60
5 to 9 years inclusive	21
10 to 14 years inclusive	2
15 to 19 years inclusive	1
20 to 24 years inclusive	1
25 to 60 years inclusive	2

Susceptibility to Diphtheria according to Sex.

By applying the Schick reaction to a large number of children of both sexes in e York schools, Zingher [339] and his collaborators were able to prove that at all ages, ex five to six, girls are more susceptible than boys.

The following tables illustrate this fact:

New York Schools (Manhattan).

Age	*Boys*		*Girls*	
	No. injected	Percentage of Schick positives	No. injected	Percentage of of Schick positives
5–6	74	46.0	60	45.0
6–7	195	37.8	207	40.6
7–8	248	33.4	244	38.1
8–9	277	27.4	219	31.5
9–10	393	21.9	281	39.2
10–11	675	21.8	264	23.4
11–12	782	19.5	299	24.1
12–13	783	14.8	479	20.7
13–14	740	12.3	497	20.1
14–15	500	13.0	361	21.3
15–16	224	7.5	155	13.4
16–17	31	6.4	21	14.3
Total	4,922	19.2	3,087	25.3

Manhattan Lunatic Asylum.

Age	Men		Women	
	No. injected	Percentage of Schick positives	No. injected	Percentage of Schick positives
10–20	88	14.7	80	13.7
20–30	705	7.8	548	16.6
30–40	746	7.5	742	13.7
40–50	517	5.8	703	9.9
50–60	334	6.5	586	6.3
60–70	151	3.3	511	6.6
70–80	62	3.2	119	6.7
Total . .	2,603	7.0	3,289	10.0

It would be interesting to know what is the precise part played by sex in such variations of susceptibility and to what extent these variations are due to different modes of living as between the two sexes, for we shall presently see that the individual's mode of life is an important factor in the acquisition of anti-diphtherial immunity.

Susceptibility to Diphtheria according to Social Environment.

The study of individual susceptibility to the Schick test under varying social conditions entitles us to conclude that man is more sensitive to diphtheria if he belongs to the well-to-do classes, or, in other words, if he lives in less thickly populated areas and is consequently less exposed to infection. The difference reaches 100 per cent to 200 per cent, as is proved by the following statistics:

Schick Reactions among Children of the Poorer Class in New York living in Thickly Populated Areas [339].

Age.	No. of Children examined.	Percentage of positive Schick reactions.
4–6 years	1,328	58.6
7–10 »	903	36.5
11–14 »	235	22.5

Schick Reactions among New York Children of the Well-to-do Classes living in less Den Populated Areas [339].

1. Children attending kindergartens and 1 A classes:

Age.	No. of Children examined.	Percentage of positive Schick reactions.
5–6 years	327	77.15
6–7 »	933	67.73
Total	1,260	70.25

2. Children attending School No. 52, Manhattan:

5–6 years	19	84.21
6–7 »	69	82.61
Total	88	83.41

Out of 55,649 pupils attending 68 city schools in Manhattan, 17,294 went to 27 scho frequented by children of the well-to-do classes. Among the latter, from 70 to 30 per c susceptibles were detected according to the schools, whereas, among the 38,355 child at 41 schools attended by the poorer classes, the number of children giving a posit Schick reaction reached only 30 to 14 per cent.

A very large percentage of the 26,955 pupils at 33 State schools in the Bronx area which is less densely populated than Manhattan and where the danger of contaminat is consequently less — are susceptibles. In 29 schools the number of positive Sch reactions varied from 63 to 32 per cent; in only four schools was the number so low 28 to 17 per cent.

Since observation shows that in urban areas natural immunity from diphtheria is relation to the density of the population, we should naturally expect that the number immunes in rural and sparsely populated areas would be small. The application of Schick test has fully confirmed this supposition, as the following figures show:

Schick Reactions in the Country Schools of Metucken, Caldwell, Verona, and Cedar Grove (N. J.) [339].

Age.	No. of Children injected.	Percentage of positive Schick reactions.
5–6	69	88.8
6–7	85	85.8
7–8	96	85.4

Age.	No. of Children injected.	Percentage of positive Schick reaction.
8–9	117	79.5
9–10	101	74.2
10–11	91	67.0
11–12	98	76.5
12–13	83	72.7
13–14	90	73.3
14–15	36	63.9
15–16	57	75.4
16–17	56	71.4
Total	984	76.9

Among hospital nurses coming from rural districts to the New York hospitals, gher [339] found 50 to 75 per cent giving positive Schick reactions, whereas the percentage light among native New York City nurses.

The relation between immunity and the varying chances of contamination is noticeable ıll ages.

These observations by Zingher [339] and his collaborators demonstrate that natural nunity from diphtheria is acquired as a result of unnoticed but repeated diphtheria taminations, for it is intimately connected with the varying chances of contamination which the individual is exposed.

In different New York districts it has been found that among healthy persons 1 to er cent are carriers of virulent diphtheria organisms. This would appear to be a imum figure. As a matter of fact, in the Willard Parker Hospital for Infectious eases, Park (1) has found that over 5 per cent of the scarlatina cases were carrying fler's bacilli.

We may agree with him that this figure corresponds more closely to the facts. The ats of scarlatina patients, which offer an especially favourable medium for the proli- tion of Löffler's bacilli, would enable this point to be established with greater certainty.

In any case, there is no doubt that the greater the number of people — and conse- ntly of diphtheria carriers — with whom the individual comes into contact, the greater chances of contamination.

There is, therefore, nothing surprising in the fact that an examination of the relative eptibility to the Schick test shows that immunity from diphtheria is more or less uliar to a certain social class.

The influence of contact on natural immunisation from diphtheria is also clearly onstrated by the following observations published by Zingher [339]. They are prac- lly equivalent in value to an experimental test.

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1 Verbal communication.

In an institution containing more than 500 children living in close contact, Zin found that the percentage of those giving a positive Schick reaction was 33.3 a children who had been living there for less than three months. This percentage f 5.4 amongst those who had been there longer. Dudley [76] in England, has also s that in an environment where the number of diphtheria carriers is high the numb naturally immune persons is also high.

It therefore seems that contact with the diphtheria bacillus is the main fact acquired natural immunity from diphtheria and that age, race, heredity and sex are secondary factors.

The observations carried out in the United States, which show that the acqui of natural immunity from diphtheria is proportionate to the frequency of contamin by Löffler's bacillus and consequently varies with the mode of life of the population show that during the first years of life this difference between social classes is less ma than later on.

Zingher's [339] statistics demonstrate indeed that school-children in the poor congested districts become more rapidly immune as a result of frequenting school well-to-do children in less densely populated areas.

In the following table, the schools of Group I were, in general, the least conge districts, and those in Group III the most congested.

Susceptibility to Diphtheria of Children in various Groups of Schools in New Yo (Manhattan and Bronx).

Age	Group I 12 schools 67-40% positive Schick reactions		Group II 10 schools 40-30% positive Schick reactions		Group III 22 schools 30-13% positive Schick reactions	
	No. of Children examined	Positive reactions	No. of Children examined	Positive reactions	No. of Children examined	Positiv reaction
4–5	6	100.0	9	66.6	15	60.0
5–6	376	75.2	297	59.5	723	46.6
6–7	1,142	67.8	992	50.5	2,276	32.5
7–8	1,315	51.1	1,246	42.6	2,709	32.4
8–9	1,390	55.6	1,331	37.6	3,090	25.5
9–10	1,382	48.4	1,473	35.5	3,507	22.8
10–11	1,276	44.1	1,340	34.4	3,851	21.1
11–12	1,348	46.9	1,380	35.1	3,905	20.0
12–13	1,164	40.4	1,267	29.7	3,760	19.8
13–14	966	36.3	1,007	26.6	3,415	16.6
14–15	665	30.2	730	26.4	2,285	11.6
15–16	312	27.9	295	15.1	947	11.9
16–17	73	37.0	35	14.3	136	12.5
Total	11,405	49.2	11,422	35.8	30,619	22.7

The hereditary transmission of a certain natural passive family and maternal immu-
it, on the one hand, and natural active immunisation as a result of contact with diph-
ria cases, on the other — contact which varies in frequency and duration according to
al class — explain why it often happens that all the children in one family react in
same way to the Schick test.

Since a small number of persons remain sensitive to the Schick test until very late
fe, we are led to the conclusion that their organisms are hereditarily incapable of pro-
ng anti-bodies under the influence of the diphtheria antigen, for we cannot suppose
they have never been exposed to contact with it during the whole of their life.

The Influence of Race on Susceptibility to Diphtheria.

The experiments carried out by the school of Park [339] at New York show that indivi-
l susceptibility to diphtheria is to a certain extent influenced by racial factors. In
v York, children born of American parents give the greatest number of positive Schick
tions, while those born of Italian parents are very frequently immune. It seems,
ever, that the variation in susceptibility met with among different races is more
arent than real and is to be attributed to social rather than to racial differences.

In New York it has been found that the number of immunes among school-children
rish origin is small in the case of children frequenting schools situated in the less
sely populated areas of the city, whereas those living in the overcrowded districts
w a high percentage of immunes. Although the number of immunes is very high
ng school-children of Italian origin, it would seem that this is mainly due to natural
unity acquired by these children as a result of frequent contacts with diphtheria to
ch they are exposed through living in the most populous districts of the city.

Duration of Acquired Natural Immunity.

According to observations in America [220, 222], an individual who gives a negative
ick reaction after he has lost his antitoxin of maternal origin remains a negative reactor
the rest of his life. The most serious and debilitating diseases do not make any
erence.

Cases in which a subject giving a negative Schick reaction has, at a later date, given
positive reaction are so rare that it is perhaps permissible to wonder whether such
lervations are not the result of some technical or interpretative error.

Susceptibility to Non-Specific Proteins.

As it has been impossible, up to the present, to obtain diphtheria toxin in the pure
e, the careful study of the Schick reaction has also made it possible to study the
iations of individual susceptibility to proteins produced by lysis of the Löffler bacillus
l of its culture medium.

Zingher's [339] investigations, which extend to more than 60,000 New York sc children, clearly show:

(1) That protein reactions are frequent.

(2) That at all ages they are two and a-half times more frequent among imm than among susceptibles.

(3) That at all ages they are more frequent among females than among male

It may therefore be concluded:

(1) That, in order to avoid errors in interpreting the Schick test, a control inje of heated or neutralised toxin must always be made simultaneously with the inje of toxin. This is the surest method of avoiding confusion between positive reaction the allergic response of the organism to the intra-dermal injection of the proteins conta in the culture.

(2) That the greater frequency of protein reaction among immunes is prob due to the sensitisation of the organism to proteins of the Löffler bacillus in the co of natural immunisation against diphtheria through unnoticed spent, abortive or typical specific infection, as a result of contact with bacillus carriers.

Schick Reactions in New York State Schools (Manhattan and Bronx). Susceptibi according to Age, to the Toxin and to the Proteins of the Culture Medium.

		Percentage of Susceptibles			Percentage of Immunes		
			Percentage of combined reactions			Percentage of pseu reactions.	
Age	Number of Children injected	In relation to the total number of Children injected	In relation to the total number of Children injected	In relation to th total number of positive reactions	In relation to the total number of Children injected	In relation to the total number of Children injected	In relati to the to number negativ reactio
4–5	30	70.0	0.0	0.0	30.0	3.0	11.0
5–6	1,575	63.2	1.3	2.0	36.7	4.0	12.0
6–7	5,377	49.2	1.0	2.0	50.8	6.0	12.0
7–8	6,130	43.0	2.0	4.0	57.0	8.0	14.0
8–9	6,539	36.1	2.8	8.0	63.9	10.0	16.0
9–10	7,071	31.4	2.7	0.0	68.6	14.0	21.0
10–11	7,205	28.6	2.7	9.0	71.4	16.0	22.0
11–12	7,344	28.9	3.0	10.0	71.1	16.0	22.0
12–13	6,405	28.4	3.0	11.0	71.6	13.0	18.0
13–14	6,252	28.6	3.0	16.0	77.4	22.0	28.0
14–15	4,147	19.1	3.0	15.0	80.9	20.0	25.0
15–16	1,760	18.1	3.0	16.0	81.9	21.0	26.0
16–17	247	19.8	4.0	23.0	80.1	18.0	22.0
17–18	18	11.1	0.0	0.0	88.9	11.0	12.0
Total	60,100	32.6	2.7	8.3	67.4	14.0	20.7

Reaction to the Schick Test of Diphtheria Carriers.

While it is true that most healthy carriers of diphtheria bacilli give a negative Schick ion, it is none the less true that the number of such persons giving a positive Schick ion is considerable. Therefore, some other form of immunity must exist side by with the serium immunity demonstrated by the presence of antitoxin in the blood. Such immunity appears to be of epithelial origin.

Germ carriers giving a positive Schick reaction appear to develop active natural nity as a result of the bacilli they carry, for, on the one hand, as Martin [167] has shown, erms always secrete a small quantity of toxin in their host and, on the other hand, al active immunity is principally a result of contact with Löffler's bacilli, as the tigations carried out by Park and his school among various social classes have proved.

In the case of carriers who are negative Schick reactors, the virulent bacilli have, ably, according to Martin [167], been rendered avirulent by the antitoxic action of the nic fluids. This hypothesis needs to be confirmed by observation and experiment.

The Schick Reaction and Anti-Diphtherial Serotherapy.

The Schick test has, in the hands of its inventor and of Moody [181], Grœf and berg [98], made it possible to verify clinical observations regarding the efficacy of the venous injection of serum in serious cases. For a given number of antitoxic units nistered, the therapeutic efficiency is from 10 to 20 times greater when they are duced intravenously than when they are administered subcutaneously.

After an attack of diphtheria, the Schick reaction does not always become negative, t would seem that the earlier sero-therapeutic treatment is resorted to, and the more etic such treatment is, the less the chance of its becoming negative.

Taking into consideration the deductions which, as a result of the Schick test, it has possible to make regarding the origin of natural active immunisation — repeated prolonged contact with Löffler's bacilli — we may ask ourselves whether the complete alisation of the toxin by antitoxic serum has not destroyed the stimulus necessary eate immunity.

The Schick Reaction and Infectious Diseases.

The study of the Schick reaction among persons suffering from infectious diseases than diphtheria has shown that, generally speaking, a greater number of positive k reactions occur among infectious cases than among healthy individuals, and that, in cular, the number of positive cases is less among infectious patients in proportion as nfectiousness of the malady from which they are suffering, as measured by case ience over several years, is greater.

The results of Zingher's [324] observations are as follows:

Age	Measles	Scarlet Fever Percentage of Susceptibles	Poliomyelitis
0–3 months			18.2
3–6 »	28.6		33.3
½–1 year		50.0	78.7
1–2 »	34.0	67.6	82.6
2–4 »	42.1	65.9	79.3
4–6 »	34.0	53.4	65.6
6–8 »	18.2	37.2	54.8
8–10 »		27.8	31.3
10–15 »			42.9
15 »		25.5	33.3

There can be no question here of the absence or loss of immunity resulting fron debilitation of the organism by disease. For, according to all observations, immu once acquired is never lost.

Zingher considers that natural immunity from diphtheria is merely a special ex sion of the organism's general immunity from all infectious diseases.

From what we know of the incidence of diphtheria according to age and social e ronment, and from what we know of the epidemiology of other infectious diseases, t observations and Zingher's theory should, we think, be subjected to careful criti before they are accepted as correct.

The Schick Reaction and Sero-Prophylaxis.

We have seen that the Schick reaction may be positive after a patient has been c of diphtheria by serotherapy. Zingher [222], using the Schick method, has observed the preventive injection of a thousand units of anti-diphtheritic serum gives immu for three or four weeks on an average; the injection of a fresh dose of a thousand antit units prolongs the immunity by five to seven days. The more numerous the injecti the shorter becomes the period of additional immunity. Rieux and Zöller [253] have obse the same phenomenon in France.

As a result of the repeated injection of serum into the tissues, the organism beco able to digest and assimilate with increasing rapidity the foreign albumins introdu into the circulation.

It will therefore be seen that anti-diphtherial prophylaxis by passive artificial im nisation can only be prolonged for several weeks if the injections are given more and m frequently and at increasingly shorter intervals.

Indications for the Schick Test.

The Schick test constitutes, as we have seen, a sure and practical method of determin- susceptibility to diphtheria. It may therefore be used to aid in distinguishing sus- ed cases of diphtheria. But, from this point of view, its value is rather experimental l practical if applied during the course of the disease; it is, on the contrary, of great ue if it is applied beforehand.

Its application is particularly desirable in endemic areas for the purpose of determining eptibles and immunes and enabling rational prophylactic measures to be adopted.

The Schick test should be applied whenever it is desired to carry out immunisation nst diphtheria infection, in order to limit vaccination to persons who are susceptible.

A subject who has been given active artificial immunity cannot be declared immune ss he shows a negative Schick reaction.

ACTIVE ARTIFICIAL ANTI-DIPHTHERIAL IMMUNISATIO

Experimental Bases.

The researches of von Behring [23-29] and Roux [267] have taught us that horses p duce a very large quantity of diphtheria antitoxin under the influence of injection sub-lethal doses of diphtheria toxin.

In order to ascertain the quantity of antitoxin present in the blood, it is necessary determine to what extent the antitoxin is able to neutralise the toxin. Such titratio effected by inoculating guinea-pigs with fixed quantities of toxin-antitoxin mixtures.

When guinea-pigs which had already received the toxin-antitoxin mixture w injected with a view to further titrations, several of them were found to be immunis It was shown as the result of experiments that this immunity only develops after fr four to six weeks.

Anti-diphtherial immunisation by means of the toxin-antitoxin mixture appea to be possible.

It was in 1895 that mixtures of toxin-antitoxin were first employed by Babes [12], w a view to the active immunisation of guinea-pigs. Subsequently, Nikanorow [191] succeed in actively immunising horses and goats by means of T.A. (1), and Madsen and Drey rabbits and goats. Other investigators [2, 71, 77, 142, 242,] however, only recorded failur

In any case, the successes which had been obtained showed that not only sligh sub-neutralised mixtures but also over-neutralised mixtures are capable of effecti immunisation.

It was also proved by Wernicke [220] in 1895 that, in the case of female guinea-pi inoculation with a mixture of living diphtheria bacilli and antitoxin immunises not on the mother but also her progeny for a period of several months.

In 1896, Park [220] immunised horses by means of toxin over neutralised by antitox

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[1] T.A. = mixture of diphtheria toxin and antitoxin.

Dreyer and Madsen [220] determined in the same year the optimum proportions of toxin antitoxin mixture which should be employed to effect immunisation.

In 1903, Park [208] showed that the injection of 10,000 M.L.D. (1) of exactly neutralised n occasioned, in the case of horses, the formation of approximately 60 units of anti- n per c.cm. of blood, while the same dose of toxin, neutralised six times, produced three units of antitoxin.

In 1905, Theobald Smith [220] confirmed Wernicke's observations and laid down two s as the duration of the immunity acquired by guinea-pigs.

In 1909, Smith [288] inoculated gravid guinea-pigs with exactly dosed mixtures of T.A. examined the immunity of their young. He concluded that the most complete immu- was obtained by utilising slightly sub-neutralised mixtures.

In 1912, Lowenstein [162] confirmed the results of Smith's researches.

Since then the employment of T.A. has become the ordinary method of immunising es with a view to obtaining anti-diphtherial serum.

As regards human beings, certain attempts at active anti-diphtherial immunisation neans of inoculation with diphtheria toxin were carried out at the end of the nineteenth at the beginning of the twentieth centuries.

The results were not brilliant. The injection of an infinitesimal quantity of toxin rise to violent local reactions and sometimes paralyses.

On May 8th, 1913, von Behring [23-25] published an account of his first attempts to unise human beings by means of toxin neutralised by antitoxin.

Hahn [107] showed by experiments on guinea-pigs that, in the case of 36 out of 40 of subjects treated, antitoxin developed rapidly in the blood (2).

Hahn and Summer [109] applied active immunisation by the injection of a von Behring n-antitoxin mixture to 1,097 children of the Magdeburg district, where diphtheria prevalent in an endemic state; 630 children received three injections, 255 two and one.

These investigators did not determine, either before or after the treatment, the quan- of antitoxin present in the blood of the subjects injected. They noted, however, that, tly after inoculation, the number of diphtheria cases was approximately the same ng those who had been injected and those who had not, while, later on, the number of s of diphtheria became distinctly higher among the latter. They also observed that injections did not protect carriers from infection.

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[1] M.L.D. = minimum lethal dose of diphtheria toxin for guinea-pigs weighing 250 grammes, injected utaneously.

[2] Now that we know that antitoxin is only produced slowly, we understand why von Behring found antitoxin in the case of a certain number of the subjects he injected, the others not having time to develop the antibody at the moment of control.

In the same year, Schick discovered that the intra-dermal neutralisation of the diphtheria toxin tituted a simple and practical means of determining the antitoxic immunity of a subject before and the immunising inje tion.

It was only after the end of the world war that we heard of further attempts at ac anti-diphtherial immunisation in Europe.

In 1914, von Behring [26,27] announced that 7,000 vaccinations had been carried successfully with his T.A.

In 1920, Bieber [39] published a monograph on the children inoculated by Hahn Summer. He showed that in the space of six years 15 per cent of the 3,203 childre the Magdeburg district, who had not received the immunising injections, had contra diphtheria, while only 4.6 per cent of the total number of those who had been inje and 3.3 per cent of those who had received three injections had been infected. Bi concluded that the von Behring method deserved to be tried on a larger scale.

In the United States of America, Park [220] and his collaborators, who, at the tim von Behring's first announcement, were engaged independently in the investigatio active anti-diphtherial immunisation by means of T.A., have, since the end of 1913, g a large number of injections of toxin-antitoxin to children in New York schools, usi T.A. mixture prepared according to their own prescription, as von Behring has n disclosed the exact composition of his product.

Choice of the T.A. Mixture.

For the purposes of active anti-diphtherial immunisation, it is necessary to prep a mixture of toxin-antitoxin of such a character that the *toxin* is *sufficiently neutrali* for its harmful effect on the organism to be reduced to a minimum without any diminu in the immunising action of the mixture; it is also important to use a product contai *very few bacterial products and foreign lytic proteins* in order to reduce the protein react to a minimum.

Experience proves that the local (and sometimes general) reactions which followh injection of T.A. containing 3 L + doses of toxin are due not to the toxin itself but proteins present in the medium, as they also occur after injection with a T.A. mixt the toxin of which has been destroyed by heating, or even after injection with a very sm quantity of bacillary lytic products.

These reactions, moreover, are just as intense in the case of those possessing antito as in the case of those who do not possess any, and they are most severe in the cas persons who have given a pseudo reaction or a combined reaction to the Schick test

In order to obtain preparations containing a minimum of products due to bact autolysis, it is advisable to heat the meat (used for preparing the bouillon) before let it soak; in order to obtain a bouillon of only slightly nitrogenous character, it is advisable to reduce the period of culture to the minimum compatible with the produc of a sufficiently active toxin.

Finally, it is necessary that the mixture should be *stable.*

In order to effect this, both the toxin and antitoxin contained in the mixture ou to remain stable throughout a series of experiments. The use of old toxins and antito is preferable, as they alone are relatively stable.

As the toxin of the T.A. mixture deteriorates more rapidly than does the antitoxin, mixture neutralises itself more and more in course of time and becomes less toxic, but less active. It is therefore advisable to use, for preference, *freshly prepared* products. perience has, however, shown that, if the mixture is well made, deterioration is slow l the product remains active for several months.

After carrying out many immunisation experiments on animals, Park's [284] choice fell a mixture containing 3 L + (1) of toxin per c.cm., neutralised in such a manner that c.cm. injected subcutaneously causes paralysis in guinea-pigs weighing 250 grams bout 25 days. This mixture contains 0.85 L + per antitoxic unit of serum. Thou- ds of children were inoculated with it. The immunity was controlled in the case of 000 of them.

Six months after inoculation, 80 per cent of the susceptible children who received ee injections of 1 c.cm. of the mixture were found by the Schick test to be immune; per cent of those who had been inoculated twice, and 50 per cent of those who had eived only one injection, also gave a negative Schick reaction. Fifty per cent of those o, having been inoculated three times, remained susceptible after six months became actory after the end of the first year; the remaining 50 per cent were treated with a v series of injections and were all immunised.

According to the subsequent observations of Park, the number of those who are not nunised after two series of injections is infinitesimal.

The only disadvantage of Park's original preparation was that in the case of a good ny subjects, specially those no longer young, the local reaction of protein origin ich followed the injection was rather severe. In order to overcome this disadvantage, nzhof [284] and others attempted, without success, to obtain diphtheria toxin in its pure state.

Park [284] and his collaborators then tried active artificial immunisation by means of ctures containing weaker quantities of toxin and consequently smaller quantities of olytic products.

Zingher and Schröder [284] had observed, when controlling, by means of the Schick test, dren who had been injected with a mixture containing twice the quantity of L + con- ned in the standard preparation, that the percentage of immunes was no higher.

The immunising power, therefore, did not appear to be in relation to the quantity oxin contained in the mixture. Park and his collaborators inferred, therefore, that it uld be logical to try inoculation with weaker quantities of toxin than those contained the standard preparation.

The results of their researches are summarised in the following table, in which the mpts at immunisation carried out quite recently by means of pure toxin and toxoids also tabulated.

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(1) L + = the minimum quantity of diphtheria toxin which, with the addition of one unit of anti- n, will, when injected subcutaneously into a guinea-pig weighing 250 grams, cause its death within days.

Quantity of the original toxin in c.cm. of the mixture.	Number of persons injected.		No reaction		Feeble reaction		Average reaction		Strong reaction		Very strong reaction		Immunity after 4 months' Negative Schick reaction
	Ch (2)	A	Ch.	A	Ch.	A	Ch.	A	Ch.	A	Ch.	A	Ch.
0.1 L + (1) 4 MLD	490	117	25	26	64	44	11	20	0	10	0	0	90
0.5 L + 20 MLD	304												95
3 L + 120 MLD	318	261		17		12		22		36		13	92
5 L + 200 MLD	487		0		41		37		22		0		85
Diluted toxin 0.15 MLD for the first dose		29		35		24		45		24			
0.025 MLD for the second and third doses		29		62		25		8		4			
Toxoids (1)		211		50		37		10		3			

The 0.1 L +, which contains only one-thirtieth of the amount of toxin contai in the standard mixture, and which exercises almost as strong an immunising actio the latter and provokes hardly any protein reaction, has, since these experiments, b employed by Park and his school in place of the 3 L + mixture for anti-diphtherial im nisation.

This mixture contains approximately 0.75 L + per antitoxic unit.

In spite of the excellent results obtained by Park, it may be questioned whether mixtures containing only 0.1 L + are fully as potent as mixtures containing 3 L +

The manner in which the T.A. exercises its action does not appear to be defini known. The immunity which the T.A. confers cannot be explained by the quantity antitoxin contained in the mixture, supposing it is liberated in the body, for the antito in question does not exceed 0.1 to 3 units per c.cm.; nor does it appear to be due to quantity of toxin which has remained free in the mixture, as neutralised and even o neutralised T.A. mixtures also confer immunity.

If we admit that the toxin and antitoxin complex disintegrates slowly in the organ and that the toxin thus freed act as an immunising factor, we must suppose that the m tures which contain several L + doses are more active than those which contain onl fraction of 1 L + dose.

If, on the other hand, we admit that the T.A. complex acts as a stimulant upon leucocytes for the production of antibodies, it may be inferred that it must be advantage to use a mixture containing a fairly large quantity of active products.

It is true that the protein reactions are greatly diminished by the use of the 0.1 L + mixture, but the possibility of local toxin reactions is increased. These reactions, howe are less disagreable than the protein reaction.

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[1] The recent researches of Schröder and Park confirm once more the observations made nc earlier, *i.e.* that active anti-diphtherial immunisation by means of pure toxin is a dangerous met they have also tried the injection of toxoids. This method has already proved successful in the ca animals ever since the work of von Behring, but for several reasons it is not, at present, the prefe method either for human or for animal immunisation.

[2] Ch = children. A = adults

Preparation of the T.A. Mixture.

According to the recommendations of the United States Public Health Service, T.A. mixtures are prepared as follows. Well-aged toxin and antitoxin are used:

The L + dose of toxin is determined in relation to the standard antitoxin. The toxin is titrated in relation to the L + dose of this toxin so that the mixture, with it, will permit only 25 per cent of the injected guinea-pigs to survive the injection days.

If the human dose to be injected is 3 L +, the toxin must be sufficiently active for dose to be contained in less than 1 c.cm. If the dose to be injected is less than +, it is better, in order to obtain the required L + content, to dilute an active toxin to use a weak toxin. The first and largest addition of antitoxin to the toxin is prefer- made before the toxin is diluted; in any case, not more than 30 minutes should be lwed to elapse between the dition of the toxin and the addition of the antitoxin. physiological saline to be employed for dilution should be of a temperature varying veen 0 and 5 degrees centigrade, for the toxin deteriorates rapidly if the temperature gher. In order to facilitate the addition of an exact quantity of antitoxin, it is advis- to employ it in a diluted form. The solutions of toxin and antitoxin should be tained at a temperature of under 5 degrees before being mixed.

0.5 per cent of phenol should be added as an antiseptic. It has been shown by searches carried out at the laboratory of the U. S. Public Health Service that when a ture of toxin and antitoxin has once been made its toxicity ought not to be increased he addition of toxin. It is therefore always advisable to make the trial mixture toxic and to reduce its toxicity by the addition of antitoxin.

If, by accident, too large a quantity of antitoxin has been added, the mixture may sed for the immunisation of horses, but its toxicity must not be modified for human by the addition of toxin.

It is permissible to mix two different mixtures of nearly the proper strength in order btain eventually a mixture of the desired toxicity.

After each addition of antitoxin, the mixture should be shaken for twenty minutes should then be allowed to remain undisturbed for at least 24 hours in order to enable antitoxin to combine with the toxin. Only then can the injections into guinea-pigs he purpose of discovering the toxicity be carried out.

In order to prepare the experimental mixture, less than one antitoxic unit diluted in volumes of physiological saline is added to each L + dose, and guinea-pigs are then ted for the preliminary trial.

More or less large quantities of antitoxin should then be added according to the toxi- of the product until the desired toxicity is obtained.

According to the recommendations of the United States Public Health Service, advisable to add antitoxin to the toxic mixture until those guinea-pigs which receive m. of the mixture survive for more than four days. After filtration, the mixture

should be kept until about half the guinea-pigs injected with 5 c.cm. survive for ten da and only die slowly with paralytic symptoms. At that stage the product is ready to tubed for use.

The researches of the Hygienic Laboratory show that the ideal toxicity of the T mixture should be such that the injection of five human doses into five guinea-pigs weighi 300 grams would cause the death of two of them from acute diphtherial intoxication, a the delayed death with paralytic symptoms of the three others, after 15 to 35 days. C of guinea-pigs receiving each a single human dose injected subcutaneously, one should of paralysis after 15 to 35 days and the four others should present definite symptoms paralysis but should survive.

A slight difference of toxicity does not matter. Thus, 4 to 0 of the guinea-p receiving 5 c.cm. of the mixture may die of acute intoxication, provided that more th half of those surviving die of paralysis and that, of the guinea-pigs receiving one hum dose, 3 to 0 die of paralysis, some of the others surviving with paralysis.

Most of the manufacturers of T.A. in the United States have adopted this *mod operandi*, and several States require that the products shall conform to these regulatio

Park gives the following criteria to the limit of non-dangerous toxicity:

One c.cm. of the mixture will not cause the death of the guinea-pig in less th 15 days; 2 c.cm. must produce marked paralytic symptoms.

The following table shows the immunising power of the mixtures, neutralised different degrees.

Preparation No.	Toxicity in the case of guinea-pigs weighing 250-300 grams injected subcutaneously		Immunity of children from 4-6 months after injection	
	1 c.cm.	5. c.cm.	Number of injections	Percentage o immunity
1.	+(1) 17 days	+ 4–5 days	131	92
2.	+ 17 »	+ 5–8 »	269	92
3.	+ 21 »	+ 5–6 »	796	91
4.	Paralysis	+ 17 »	608	87
5.	Paralysis	+ 22 »	127	85
6.	Paralysis	+ 25 »	763	76
			2704	

It will readily be appreciated that, if very small quantities of toxin are used in orc to effect immunisation, it is difficult to adjust the neutralisation so as to maintain a su cient margin between the immunising dose and the toxic dose.

It has been noted that in order to obtain active mixtures the neutralisation of t toxin by the antitoxin must be the less complete the smaller the amount of L + contain in 1 c.cm. of the mixture.

[1] + = death.

The 3 L + mixtures are neutralised in such a manner that 1 L + is supplemented about 1.10 antitoxic units; the 1 L + mixtures only contain a very slight excess of toxin and the 0.1 L + mixtures only contain 0.75 of an antitoxic unit per L +.

Directions. Dose for Injection.

The T.A. mixture is injected as supplied by the producer under the skin of the arm, the level of the insertion of the deltoid.

An adult receives three inoculations of 1 c.cm. at intervals of 8-15 days (1). The dose a child under 1 year of age is 0.5 c.cm.

We must remember that children stand the T.A. better than adults.

It is advisable to reduce the dose of the T.A. mixture to be injected in the case of viduals who give strong protein reactions to the Schick test. Inoculation with tional but repeated doses of T.A. is advisable in the case of persons who are predis-ed to strong reactions to the T.A. injection.

Reaction.

As a result of the T.A. injection, an inflammatory reaction, characterised by slight efaction, redness and a certain amount of pain, may appear at the site of inoculation. s reaction disappears rapidly. In the case of a few rare individuals, general symptoms sisting of fever and malaise may occur.

The reactions are, as a rule, most marked in the case of subjects who have given a ng protein reaction to the Schick test. While rare among young children, they are more frequent and the more severe the older the subject.

They are due to the action of the proteins of the bacterial lysis, for they become more ere in proportion as the mixture contains a larger amount of such products.

Serious or dangerous reactions have never been observed after the use of properly pared T.A. mixtures.

The following observations of Schröder and Park [284] show the moment at which the ction, following the injection of T.A., reaches its maximum, and the duration of the ction.

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[1] Zingher, having observed that in the case of naturally immune horses and children the injection .A. causes a noticeable increase of antitoxin only after a period of eight days, wondered whether a her dose of T.A. injected less than eight days after the previous one would not be rapidly destroyed the metabolic processes of the organism and lose its antigenic force.

He thought that it might be advisable to make injections at intervals of 15 days In the light of parative experiments on children, he concluded that it was, in fact, advisable to do so

Intensity of the reaction	Number of persons observed	Number of persons in whose case the reaction reaches its maximum after		Same intensity after
		24 hours	48 hours	24 and 48 hours
Very strong . .	23	—	4	19
Strong	31	6	9	16
Moderate . . .	15	4	6	5
Weak.	21	—	20	1
Total	90	10	39	41

Comparison of the intensity of the local reaction after 2, 5 and 16 days in the s of 300 persons giving, in equal numbers, strong, moderate and weak reactions.

Time after injection	Intensity of the reaction			
	Strong	Moderate	Weak	Nil
After 2 days	100	—	—	—
» 5 »	4	31	19	46
» 16 »	—	—	7	93
» 2 »	—	100	—	—
» 5 »	—	11	26	63
» 16 »	—	—	7	93
» 2 »	—	—	100	—
» 5 »	—	—	12	88
» 16 »	—	—	—	100

The local reaction consequent upon the inoculation of T.A. therefore reaches maximum intensity on the first or second day, and disappears rapidly.

The quantity of horse serum contained in the mixture is indeed so infinitesimal that would be most unlikely to render the individual seriously susceptible, or to cause shock (

Contra-Indications.

The contra-indications to active anti-diphtherial immunisation do not seem to e definitely established; they vary greatly according to various authors.

Von Behring [23-28] includes among them constitutional diseases, tuberculosis of te bones and glands, diseases of the heart, the incubation period of diphtheria and the fi six months of life.

Kramer [141], experimenting with von Behring's vaccine, recommends that activ immunisation should not be employed in the case of children suffering from the lymphac diathesis, tuberculous subjects and nurslings.

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[1] My colleague M. Bessemans[35] has shown by experiment that the injection of T.A. does not sensiti the organism through any action of the proteins of the culture bouillon.

Park and Zingher (1), and the American school in general, consider that anti-diphtherial immunisation has no contra-indications. We believe, with Henseval [115] and Bessemans [35], that it is prudent not to vaccinate persons suffering from cardiac, suprarenal, renal, intestinal or nervous lesions, on account of the great affinity which diphtheria toxin shows for these organs.

A certain number of accidents have been recorded after the injection of T.A. In every case it has been shown that products of poor quality were injected. An accident has never occurred after the injection of a controlled product.

In view of the hundreds of thousands of injections carried out up to the present time, it may be concluded that active anti-diphtherial immunisation is harmless, but the practitioner should insist on obtaining properly controlled products.

Value of Acquired Artificial Anti-Diphtherial Immunity.

In the case of animals, the value of active anti-diphtherial immunity by means of T.A. has been demonstrated by experiment.

Under the influence of the injection of T.A., the blood becomes highly charged with antitoxin. The immunised animal resists doses of toxin which are fatal several times over.

Henseval and Clevers [115] have even demonstrated that a vaccinated animal resists infect diphtherial infection; the mucous membranes of the eyes, nose and vagina, even if lesions are artificially produced, have ceased to be susceptible to infection by the Löffler bacillus, which does not even succeed in proliferating in them in the saprophytic state, while control animals which are not vaccinated all succumb to diphtheria.

As regards man, experimental diphtheria infection has not been tried in persons who have been immunised by T.A. mixtures, but it has been proved, by the Schick or Römer tests, in the case of thousands of persons immunised, that their blood acquires antitoxic properties. Eighty to ninety per cent of the susceptible subjects who have received the series of T.A. injections give a negative Schick reaction.

Even if these experimental data are insufficient to prove incontrovertibly the value of active anti-diphtherial immunisation — since, apart from antitoxic immunity, there certainly exists another immunity, probably an immunity of the tissues — the epidemiological data collected in the United States demonstrate without doubt that the method is of real prophylactic value.

Approximately, 500,000 diphtheria vaccinations have been carried out in the United States. It may be said in general that no case of toxic diphtheria has been observed among those who, after immunisation, have given a negative Schick reaction; a few cases of diphtheria of medium intensity have been diagnosed among persons who had been vaccinated.

Most of these cases occurred among subjects who did not receive the complete series of injections or who had received the three injections but were not subjected to the Schick

[1] *Vide* these names in the Bibliography.

test in order to determine whether they had in fact acquired immunity. Sometim the Schick test had been carried out incorrectly (1), and sometimes there were groun for believing that the diphtheria bacillus discovered in the morbid secretions was on of the nature of a saprophyte and that a hæmolytic streptococcus was the principal cau of infection.

The following table [220' 222'] relating to 180,000 New York children, clearly shows t value of anti-diphtherial vaccination as a means of prophylaxis against diphtheri The number of cases of diphtheria recorded among non-vaccinated children is four tim greater than that rendered among naturally immune or immunised children.

Number of Suspect Cases of Diphtheria which occurred among 90,000 *Non-Controll School-children and* 90,000 *Others, giving a Negative Schick Reaction, or Immunised means of two or three Injections of T.A. because they were Susceptible.*

	Number of cases of clinical diphther
57,000 school-children, negative Schick reaction	5
33,000 school-children, positive Schick reaction, but immunised . .	9
90,000 school-children, with negative Schick reaction, or immunised.	14
90,000 of the school-children, used as controls	56

Period required for the Development of Immunity.

Experience has shown that the body only becomes immune slowly and progressivel under the stimulus of the toxin-antitoxin complex.

Schröder and Park's [284] comparative table, which is given below, shows that, althoug the immunity conferred by the injection of T.A. can be demonstrated by means of t Schick test after three months, results should not, in point of fact, be verified before s months have elapsed, because, in the greater number of cases, immunity will only the have developed.

Interval after the three injections	Number of subjects examined	Percentage of immunity
3–3½ months	579	82.7
4 »	1,427	84
5 »	1,302	86.7
6 »	1,059	88
	4,367	

1 Park[220] and his school have shown by experiment that if the toxin is placed in tubes of an unsui able kind of glass it will rapidly deteriorate.

Duration of Immunity.

Clinical observation shows that an attack of diphtheria generally renders the individual immune for the rest of his life.

Thanks to the Schick reaction, it has been possible to ascertain definitely that acquired natural immunity is, in almost all cases, retained throughout life. Park [220] and his school have, indeed, discovered that the Schick reaction continues to be negative in about 96 per cent of natural immunes after two and five years. It is an open question whether the remaining 4 per cent should not be ascribed rather to errors of technique than to modifications in the susceptibility of the individual.

Indeed, in carrying out hundreds of Schick test control experiments by inoculating toxin into both arms, Park [220] has discovered a difference of 2 per cent between the reactions of the two arms. We must, therefore, admit that in 2 per cent of cases the Schick test may not have been properly carried out even by trained and skilful practitioners; we have also seen that the toxic value of a toxin may vary to a certain extent, and, finally, we know that the quantity of antitoxin in the blood of an individual may vary slightly from moment to moment.

The Schick [220] test has also made it possible to measure the duration of acquired artificial immunity.

Zingher and Schröder have examined 10,000 children injected 3-6½ years previously.

Year after year they have subjected these children to Schick's test. No subsequent harmful effects have been observed. All the children concerned, even those who had been immunised seven years previously, remained refractory to the test. It would be reasonable to believe that they are immune for life; but, even admitting that immunity does not last for more than seven years, the method would, nevertheless, deserve to be applied to all children exposed to infection, since diphtheria morbidity is at its highest precisely during the first eight to ten years of life.

At what Age should Immunisation be Effected ?

We have seen that most infants over six months of age are susceptible to diphtheria. Infants should therefore be immunised at a very early age. In this connection it is interesting to note the results obtained by immunising children at different ages.

Miss Denny [220] vaccinated 2,000 children on the third, eighth and eleventh day after birth with full doses of T.A. No harmful effects were observed, but, one year after injection, when 100 of the injected children were subjected to the Schick test, only 52 per cent gave a negative reaction. We must therefore admit that the nursling reacts only feebly, by the production of antitoxin, to the stimulus of the T.A. complex, which is over neutralised by the maternal antitoxin present in the blood.

The results obtained by Blum [47] and Byard [56] in the case of infants between four months

and two years of age are more encouraging. Out of 300 children who were injec over 90 per cent of those examined with regard to their state of immunity gave a nega Schick reaction 3-18 months later.

These experiments show that it is possible successfully to immunise children aga diphtheria between the age of 6 and 12 months, *i.e.* at the period when susceptibilit greatest and reaction to inoculation is weakest.

It would seem, therefore, that the best results are obtained by T.A. vaccina between the ages of six months and two years.

Factors influencing the Process.

In man, the presence in the blood of a certain quantity of natural antitoxin app to facilitate the production of antitoxin by the body under the stimulus of the T.A. in tion.

In animals, the phenomenon can be easily observed. Guinea-pigs, which scar ever possess any natural antitoxin, only become immune against diphtheria slowly with difficulty; whereas horses, which usually possess natural antitoxin, become imm with great ease and rapidity.

The experiments of Glenny and his collaborators [93-96] with guinea-pigs and v rabbits, and of Gorter [97] and ten Bokkel Huinink [97] with children, have shown that if formation of a certain quantity of antitoxin has been brought about by artificial me the organism reacts to a fresh injection of antigen by producing antitoxin more rapi and in greater quantity.

These observations are confirmed by statistical data. Zingher notes that, if Schick test is applied to a number of subjects after a first series of vaccinations, it is s that the number of subjects, which in any one environment give a negative Schick reacti is greater in proportion as the number which gave a positive reaction before immunisat is smaller.

After a second series of vaccinations, this ratio ceases to exist; almost all who have b vaccinated become immune. This fact is explained by the observations, already refer to, which have been recorded in connection with natural immunisation, acquired as result of prolonged and repeated contact with Löffler's bacillus.

Gorter and ten Bokkel Huinink [97] also note that active anti-diphtherial immunisati is more successful in the case of carriers of the bacillus.

Passive artificial anti-diphtherial immunisation by means of antitoxic serum, effect at the same time as the T.A. vaccination, impedes active artificial immunisation.

It is because the maternal antitoxin circulates in the blood of the nursling that te latter is not rendered immune, or is rendered immune with great difficulty, by injectio of T.A.

The fact that the intensity of acquired immunity has no relation to the intensity the reaction on inoculation is not surprising, since the intensity of the latter depen on the sensibility of the organism to the non-specific proteins contained in the T.A. mixtu

Indications for Active Anti-Diphtherial Immunisation.

Since our sanitary equipment has not yet made it possible for us to reach the diphria germ and destroy it wherever found, we may hope that, by immunising susceptibles inst its attacks, we may contribute towards eliminating diphtheria from the tables norbidity, since in this manner we shall be abolishing the principal factor in the propaion of the disease, namely, the infected individual.

Immunisation against diphtheria is logical and is to be recommended in various umstances.

Park [220] recommends it:

(1) As a general measure of prophylaxis.

He believes, and rightly so in our opinion, that the systematic immunisation of dren between the ages of six months and two years will eventually produce a decisive ct on diphtheria morbidity. But, as it is difficult to reach children who are under ool age, efforts should be concentrated on carrying out a campaign of prophylaxis in schools.

The immunisation of susceptibles would not only lead to the disappearance of diphria among school-children but would prevent the importation of the disease from the ool into the family and its transmission to younger children.

As regards adults, it seems that vaccination need be carried out only in the case of ceptibles who are, as a result of their profession, exposed to diphtheria infection, viz., tors, hospital nurses and schoolmasters.

In countries in which diphtheria is prevalent, in numerous endemic foci and in which ny cases are met with among soldiers, it would seem that it might be desirable to roduce anti-diphtherial vaccination into the army.

(2) As a special measure of prophylaxis in areas where diphtheria is endemic.

As the immunity bestowed by anti-diphtherial vaccination only develops slowly, method is of little use in endemic areas, as applied to persons who are immediately posed to contagion.

The latter should undergo passive artificial immunisation by the administration of itoxic serum, if the doctor considers this course advisable. But active artificial munisation is indicated in the case of those who have escaped the immediate danger of ection but still run the risk of eventual contamination.

Combined with the prophylactic injection of antitoxic serum, this method has given couraging results in districts in which diphtheria cases were numerous and the number carriers high.

It has been demonstrated by observation that:

The injection of from 500 to 1,000 antitoxic units gives children definite protection ainst diphtheria for 15-20 days. The Schick reaction is also negative during this riod.

It should be noted that Park and Williams [220] have not been able to confirm by periment the data given by Havens, who points out that 20 per cent of the diphtheria

bacilli in infected persons are of a type producing a toxin different from that us preparing the serum.

The monovalent antitoxin injected prophylactically would, it is suggested, be u completely to neutralise the toxin produced by such bacilli, and the disease might develop in carriers who have given a Schick reaction to standard toxin.

Conclusions.

At present the best results in the way of active anti-diphtherial immunisation been obtained by using various T.A. mixtures. According to observations carrie in the United States on thousands of subjects, 80-90 per cent of those injected are im ised, judging by the Schick test.

When those who were not immunised at first have been reinjected, the percer of immunes reaches nearly 100 per cent. Among individuals shown by the Schick to be immunes, there occur only one-quarter the number of clinical cases of dipht which occur among susceptibles.

The reduction of the quantity of L + per c.cm. diminishes the number of pr reactions which follow the injection, but slightly increases the local toxicity of the pro while not increasing its immunising power.

As susceptibility to diphtheria, which is slight during the first six months of exist becomes pronounced between the ages of six months and one year, and then dimin as the child grows older, the vaccination of children before they are of school age, preferably towards the end of the first year, is indicated in areas in which diphthe endemic. The younger the children are, the less do they react to the proteins of mixture.

Immunity resulting from anti-diphtherial vaccination is only acquired tar therefore, Schick test control should only be applied after three months or, b still, six months after inoculation.

The protein reaction which sometimes follows injection reaches its maximum inte in two or three days, and then rapidly disappears.

Immunity lasts for at least seven years in 90 per cent of the cases. It is prob retained through life.

Active anti-diphtherial immunisation should not be resorted to in the case of inf under six months of age, or within three weeks after an injection of antitoxin, in order the T.A. complex may not be over neutralised and that its immunising action may nc reduced by the antitoxin naturally or artificially present in the blood.

T.A. mixtures prepared with old toxins and antitoxins are the most stable. T remain active for 6-12 months if kept in the dark and at a low temperature. They sh however, preferably be employed within three months of preparation. As the t deteriorates with greater rapidity than the antitoxin, a T.A. mixture gradually lose toxicity.

T.A., properly prepared and carefully preserved, has been administered to hundreds housands of subjects and has never produced any untoward effects (1).

The Schick test provides an easy, practical and sure method for determining what sons ought to be vaccinated, but it is only of value if it is correctly carried out.

The control injection with heated toxin is always indicated, but in the case of children ler five years of age it may be omitted without any serious inconvenience, as protein ctions are rare before that age and are easily diagnosed.

As less than two-thirds of children under three years of age are diphtheria susceptibles, Schick test need not be applied until children reach three years of age, but vaccination be carried out immediately. This procedure would seem to be all the more logical, we cannot determine whether children under this age give a negative Schick reaction ause maternal antitoxin is circulating in their system, or because they have developed antitoxin naturally. Moreover, children under three years of age react but slightly to T.A. injection.

After three years of age, maternal antitoxin has disappeared, and the Schick test uld be applied before immunisation in order to avoid needless injections.

The tendency, at present, is to omit the preliminary Schick test, particularly in chil- n under six years of age and in children in the less densely settled districts. In any e, however, the Schick test should not be omitted about six months subsequent to injection of the T.A. mixture to test the efficiency of the artificial immunisation.

The immunised person should not be declared immune until he gives a negative hick reaction 3-12 months after inoculation.

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[1] A 1 L.+T.A. mixture which had been frozen and become turbid from separation of the antitoxin few instances produced rather pronounced local reactions. This is easily avoided in any one of these ys: by avoiding freezing; by using only clear mixture, or by using only 1/10 L.+mixtures.

POPULARISATION OF NEW METHODS OF ANTI-DIPHTHERIAL PROPHYLAXIS

Popularisation of Active Immunisation against Diphtheria.

We have seen that immunisation is particularly advisable in the case of children b are under school age, because they are particularly susceptible to diphtheria. But t opportunity of inoculating them in any number seldom presents itself. The dc from the health department or the lady health visitor cannot go from house to h proclaiming the benefits of anti-diphtherial vaccination and obtaining the par consent to the immunisation of their young children.

Propaganda is more easily carried out in infant welfare centres, crèches, orphan and other child welfare organisations. But the number of children who come withir purview of such institutions represents only a small minority of the total infant popula

Therefore, in view of the difficulty of popularising the method and applying it to very young, Park, in collaboration with the school authorities, introduced the sys of anti-diphtherial immunisation first of all into the New York schools.

One million children attend the schools of the "Wonder City". To distribut each of these an official circular pointing out the danger of diphtheria, demonstrating advantages of immunisation and requesting the parents to allow their children's susc bility to diphtheria to be tested and immunisation to be effectuated, if necessary, was only to popularise the method among a population of nearly seven millions but, above a engage in a campaign of hitherto unequalled magnitude against diphtheria.

This was Park's [222] programme, and the programme has now been almost comple carried out. Most susceptible school-children in New York have now been vaccina Park's method has been adopted not only in New York but also in most of the g centres of the United States: Boston, Philadelphia, Baltimore, Chicago, etc.

The means employed in the schools to enlighten public opinion may be summar as follows:

The attention of the headmaster of the school is drawn to the importance of the measures of prophylaxis against diphtheria by the Director of Education. Authorisa is obtained to apply the method. A doctor from the Health Service then gets into to with the headmaster and furnishes him with full details concerning the preventive s it is proposed to take. The headmaster or the doctor endeavours to arouse an inte in the question among the junior staff and distributes the relevant literature. Experi has shown that if the masters are won over to the cause, the number of authorisation

c nation brought back by the children is considerable. If, on the contrary, the masters ‹no interest in the matter, the number of parents who consent to allow their children id injected is very limited.

Every child who gives a negative Schick reaction receives a "diphtheria protection ·ficate" attesting to the fact that the child is naturally immune to diphtheria; the s‹ptible child who has been vaccinated receives a "temporary certificate of diphtheria o ction", stating that it has undergone active diphtheria immunisation and inviting e arents to have the Schick test applied after six months have elapsed, to determine ‹her the child is immune. If the Schick reaction then shows that immunity has been fi tely acquired, a final "diphtheria protection certificate" is issued to the child.

The New York experiment has shown that these certificates do not merely constitute c nents of great importance to the Health Services in their campaign against diph-e a but that they act as a strong stimulus to induce school-children to submit to the h k test and complementary immunisation.

By the summer of 1923, the popularisation of the Schick test and anti-diphtheria vaccin-‹ in school circles became so common that Park was able, with his staff, to undertake ·tensive campaign for the immunisation of children aged from six months to six years. Circulars in English, Italian and Hebrew, the principal languages spoken in New ›, were distributed through the agency of the headmasters and teachers of the schools. ‹ttention of the parents was drawn to the desirability of having their children immun-d‹gainst diphtheria. A list was published of "baby health stations" which undertook c nations, and other circulars were addressed to mothers whose children had attended ·at welfare centres from one to four years previously. The assistance of numerous ilnthropic organisations was enlisted for the campaign; notices were posted in public ›s, in shop windows, in the halls of lodging houses, and so on.

We may quote as an example the case of the "Metropolitan Life Insurance Co.", which s early 20 million policy holders (a State within a State) and has distributed to date › than two million circulars recommending its clients to submit to the Schick test d‹o anti-diphtherial vaccination.

The value of both of these measures is evidently recognised.

In short, propaganda has been carried out on a truly American scale and we know › experience that the American has a very different sense of proportion from that ·e European.

The propaganda on behalf of the Schick test and anti-diphtherial immunisation ·rtaken among the medical profession was every whit as intense as that undertaken ›g the public.

Members who have taken part in the interchange study tour in the United States v heard enough on the subject of "education and co-operation" to convince them that ·s was essentially the key to the success of the movement.

In order to apply the Schick test and T.A. vaccination to young children, several ·ls consisting of one doctor and one hospital nurse were allocated to various districts ·e New York town.

No Schick control injections were carried out, because protein reactions are rare easily recognisable in young children. The first T.A. injection was carried out at the time as the Schick test. The second and third T.A. injections were given one or two we later independently of the result of the Schick test. In acting thus, Park wishe emphasise the importance of immunising all children between the ages of six mo and six years.

Had the T.A. been administered to children under two years of age who had giv negative Schick reaction and not been administered to older children who had also g a negative Schick reaction, the procedure might indeed have caused confusion in the m of the parents. How could they be convinced that the negative Schick reaction very young child was sometimes only an indication that the maternal antitoxin continuing to circulate in its blood and did not imply that it had naturally acq natural immunity. Moreover, by carrying out T.A. injection at the same time a Schick test, children who were not brought for the second or third injection would at be rendered partially immune.

The immunisation of several thousand children under six years of age is at pr an accomplished fact in New York.

In the other great centres of the United States a campaign in favour of the new me was prosecuted with equal energy. It would even seem as if the various health ser were vying with each other in popularising the method. There is real emulation which shall do most to promote the widest and most effective application of the new tem. But matters do not in every case proceed so smoothly. In Boston, the h services are not permitted to have anything to do with the medical inspection of sch and consequently the support of private institutions must be enlisted. In Philadel it has been necessary up to the present to limit the application of the method to pu and private charitable institutions, orphanages, reformatories, etc. In other distr in spite of the activity of the health authorities, the public remain indifferent or scept

However, it may be said that all health services regard the Schick test and vaccination with favour and apply it with fervour.

It cannot be long, moreover, before some definite opinion is formed as to the effi of the process, for the American experiment is being carried out on hundreds of thous of subjects. We await the result with confidence.

In order that the authorities and the public may recognise the importance of anti-diphtherial campaign, it should be pointed out to them that diphtheria not occasions, economically speaking, an enormous loss of time and money on account o duration and treatment, but also causes the death of a large number of persons and off those very individuals who, by reason of their youth, would be able to work lon for the public weal and possess the potential power of perpetuating and multiplying race which is and always will be the most important economic factor in the world.

GENERAL CONCLUSIONS.

What inferences are we to draw from the experiments in the new anti-diphtherial prophylaxis carried out in the United States of America ?

The encouraging results obtained in the United States in the case of hundreds of thousands of individuals should, we think, furnish us with an incentive to popularise in Europe both the Schick test and the system of active artificial anti-diphtherial immunisation in a far more energetic manner than has hitherto been the case.

The new anti-diphtherial prophylaxis should not lead us to abandon our older methods; its value is not absolute and it is difficult to apply. Susceptibles have to be detected and immunised by three T.A. injections, and the immunity conferred must then be controlled.

This procedure has its drawbacks. The public does not willingly submit to repeated inoculation. The Americans are so well aware of this fact that they omit the Schick reaction for the determination of susceptibility whenever they can do so, and Park (1) himself is at present experimenting with a process which would make it possible simultaneously to recognise the subject's state of susceptibility and to vaccinate him partially.

It appears, moreover, that the ideal anti-diphtherial vaccine has yet to be discovered. The successes recently obtained, in the matter of immunisation, by Park [284] and his collaborators in the United States and by O'Brien (2) in England, by utilising toxoids, prove that the antigen of the future will not necessarily be the T.A. mixture. But we are convinced that, for the time being, the American process of immunisation is the best. It is the only process whose value has been demonstrated by experiments on hundreds of thousands of subjects.

We do not know the exact composition of von Behring's [23-28] T.A. mixtures. The fact that they are administered intra-dermally is not calculated to simplify the technique, which is rendered still more complicated by the fact that the proper sensitising dose has to be discovered before the vaccinating dose can be administered.

It seems, moreover, that von Behring's vaccine does not confer immunisation so readily as the American products.

The over neutralised T.A. mixtures of Renault and Levy [249, 250] are still less easy to administer than von Behring's T.A. mixtures.

The mixture of toxin and antitoxin must be prepared as required, and by very expert hands if danger is to be avoided. The number of vaccinations which have been carried out with these products is too small to provide any guarantee as to their value.

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(1) Verbal communication.

(2) Glenny and Hopkins: *Diphtheroid Toxoid as an Immunising Agent. Brit. Journal of Experim. Path.*, 1923, Vol. IV, page 283.

In areas in which diphtheria is prevalent in an endemic form, the health serv
concerned should, we think, apply the new method if they do not wish to be accuse
neglecting to employ every possible means to combat the disease.

But we still think that active anti-diphtherial immunisation should be popular
in Europe with all due consideration and care.

However much we may admire the enthusiasm with which the campaign has b
initiated and carried on in the United States, we fear that the older continent of Eu
may be loth to accept a campaign in favour of anti-diphtherial vaccination carried
with the same vigour as that witnessed in America.

Let us first of all enlighten the medical profession, and then the public, as to
advantages of the new system of anti-diphtherial prophylaxis, and let us apply this sys
wherever a careful study of the epidemiological situation convinces us that it may
resorted to with advantage.

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LEAGUE OF NATIONS

HEALTH ORGANISATION

EPIDEMIOLOGICAL INTELLIGENCE

N° 8

STATISTICS

OF

Notifiable Diseases

for 27 European countries, 15 African countries, 14 American countries, twelve Asiatic countries and for Australasia

for the year 1923

GENEVA, AUGUST 1924

LEAGUE OF NATIONS
Health Organisation

EPIDEMIOLOGICAL INTELLIGENCE

STATISTICS OF NOTIFIABLE DISEASES 1923

No. 8. GENEVA, August, 1924

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INTRODUCTION

This Annual Report prepared by the Service of Epidemiological Intelligence and Public Health Statistics of the Health Section of the Secretariat of the League of Nations, contains as complete information as is available at the present time regarding the incidence of, and mortality attributed to, the more important communicable diseases during 1923 in most countries of the world having machinery for the collection of such data. It is obvious to all who are experienced in the compilation of statistical data of this kind that some of the information contained herein is subject to later revision. The data have been obtained from the same official sources as those contained in our *Monthly Epidemiological Reports*. The tables of statistics reproduced in the annexes have been submitted whenever practicable to the responsible offices for their approval. Replies were received from the following countries :

Algeria
Austria
Belgium
Bulgaria
Czechoslovakia
Danzig
Denmark
Egypt
England and Wales
Esthonia
France
Finland
Germany
Hungary
Italy
Lithuania
Netherlands
Norway
Province of Ontario
Poland
Roumania
Kingdom of the Serbs, Croats and Slovenes
Sweden
Switzerland.

It has not been practicable to obtain similar corrections from more remote countries.

In spite of the above-mentioned limitations it has been decided to issue this Report at a comparatively early date because it is considered that delayed publication would detract very considerably from its interest and deprive it of its administrative utility.

Enough has been said to explain the omission of any attempt to analyse the figures by the application of more refined methods of statistics. Moreover, the efficiency of the notification of communicable diseases varies in different countries. For this reason crude figures are used more frequently than rates; more extended use of the latter might have tempted t reader to indulge in comparisons unjustifiable in t circumstances. The absolute numbers for a series recent years in any given country afford a sufficie indication of the trend of epidemic disease.

The text of the Report deals with the more importa facts arising from a study of the figures. An attem has been made to indicate as fully as possible t geographic distribution and seasonal variations of t more important communicable diseases during t year under report and to compare their distributi with that of previous years. Its scope is, therefor that of the series entitled *Epidemiological Intelligenc* No. 7 of which contained the statistics for 1922 notifiable diseases in Europe. The form of th *Monthly Epidemiological Report* has been use nevertheless, for this publication as better adapte for the presentation of a large amount of tabul matter.

The number of diseases dealt with is limite Certain common and widespread diseases are n notifiable in certain countries — in others the notifi cation is obviously incomplete.

At the present time, the Health Section of th Secretariat is trying to collect all available data rega ding the prevalence of venereal diseases, certai tropical diseases and other important causes of mo bidity and death. The results will be presented in supplementary volume to this Report, if considere to be sufficiently complete and important.

All corrections or amendments to the figur reproduced in this Report which may hereafter b received from the countries concerned will be publishe as promptly as possible in the *Monthly Epidemi logical Reports*.

Our best thanks are due to all public health adm nistrations and statistical offices whose help and co operation have rendered possible the publication o this Annual Report. With their continued assistanc so generously given it should be possible year b year to reduce the limitations and increase the valu of our attempt to collect in small book form a statistica summary of the havoc caused by the more importan preventible causes of suffering and death throughou the world.

Geneva, August 15th, 1924.

NOTES ON THE PREVALENCE OF NOTIFIABLE DISEASES IN 1923

PLAGUE

The general configuration of the world's plague-ıfected area remained unchanged in 1923. India ɔntained as usual a vast majority of the plague cases, ıe Upper Ganges Valley and the Punjab being the ıost severely infected.

Although no extension of great importance occurred, considerably increased prevalence was evident in ıost of the plague areas of the world as compared ith the immediately preceding years, when the incidence was relatively low. The situation has not been nearly so serious, however, as during the great epidemics which marked the first decade of the present century.

The following table summarises the available information regarding the distribution of this disease throughout the world in 1923 and gives, when possible, a comparison with 1922.

CASES AND DEATHS OF PLAGUE NOTIFIED THROUGHOUT THE WORLD IN 1923 AS COMPARED WITH 1922

Africa.

Locality	1922 *Cases*	1922 *Deaths*	1923 *Cases*	1923 *Deaths*
lgeria :	19	—	5	3
Algiers	—	—	3	2
Oran	19	7	2	—
St. Eugène	—	—	—	1
ngola	600	36	96	29
anary Islands :	—	—	46	27
Las Palmas	—	—	34	27
Teneriffe	—	—	10	—
San Juan de la Rambla	—	—	2	—
gypt :	487	228	1,519	725
Cairo	—	—	2	2
Alexandria	71	36	67	33
Port Said	54	35	51	28
Suez	58	33	47	24
Ismailia	1	1	—	—
Provinces of Lower Egypt	63	19	392	119
Provinces of Upper Egypt	240	104	960	519
enya	Epidemic		1,090	—
adagascar :	125	28	698	479
Tananarive	89	6	690	472
Diégo-Suarez	—	—	5	4
Antsirabe	—	—	2	2
Tamatave	9	2	1	1
Other localities	27	20	—	—
rench Morocco :	34	—	134	21
Casablanca	—	—	2	—
Rabat Region	—	—	5	—
Gharb Region	—	—	127	2
auritius	99	65	139	119
enegal :	750	428	1,221	846
Dakar	214	105	17	5
Rufisque	—	—	294	236
Thies	264	90	349	234
Baol	120	94	11	12
Cayor	33	25	404	216
Sine Saloum	35	35	133	139
anganyika :	—	—	36	74
Singida (sub-district of Dodoma)	30	23	—	74
unisia :	8	3	3	—
Ben Gardane	—	—	29	—
Tunis	—	—	2	—
ganda	—	1,305	948	914
nion of S. Africa	10	8	20	12
. Vincent Island (Cape Verde)	—	—	56	18

America.

Locality	1922 *Cases*	1922 *Deaths*	1923 *Cases*	1923 *Deaths*
Ecuador :	56	20	126	42
Guayaquil	56	20	88	26
Brazil :	54	35	53	34
Para	—	1	—	—
Bahia	29	20	14	9
Pernambuco	5	3	16	4
Vino del Melagro	—	—	1	—
Porto Alegre	19	10	22	21
Rio de Janeiro	1	1	—	—
Argentine Republic :				
Rosario	—	—	8	3
Bolivia :				
La Paz	—	—	—	4
Hawaii :	5	10	1	1
Honokoa	—	—	1	1
Mexico :				
Tampico	1	—	2	1
Paraguay :				
Asuncion	—	—	6	4
Peru :	839	379	870	408
Ancash	—	—	6	—
Arequipa	—	—	2	1
Cajamarca	—	—	138	47
Calao	—	—	15	9
Lambayeque	—	—	78	51
Libertad	—	—	185	90
Lima	—	—	294	136
Piura	—	—	152	74
Uruguay	—	—	3	1
Venezuela :				
Victoria	—	—	4	2

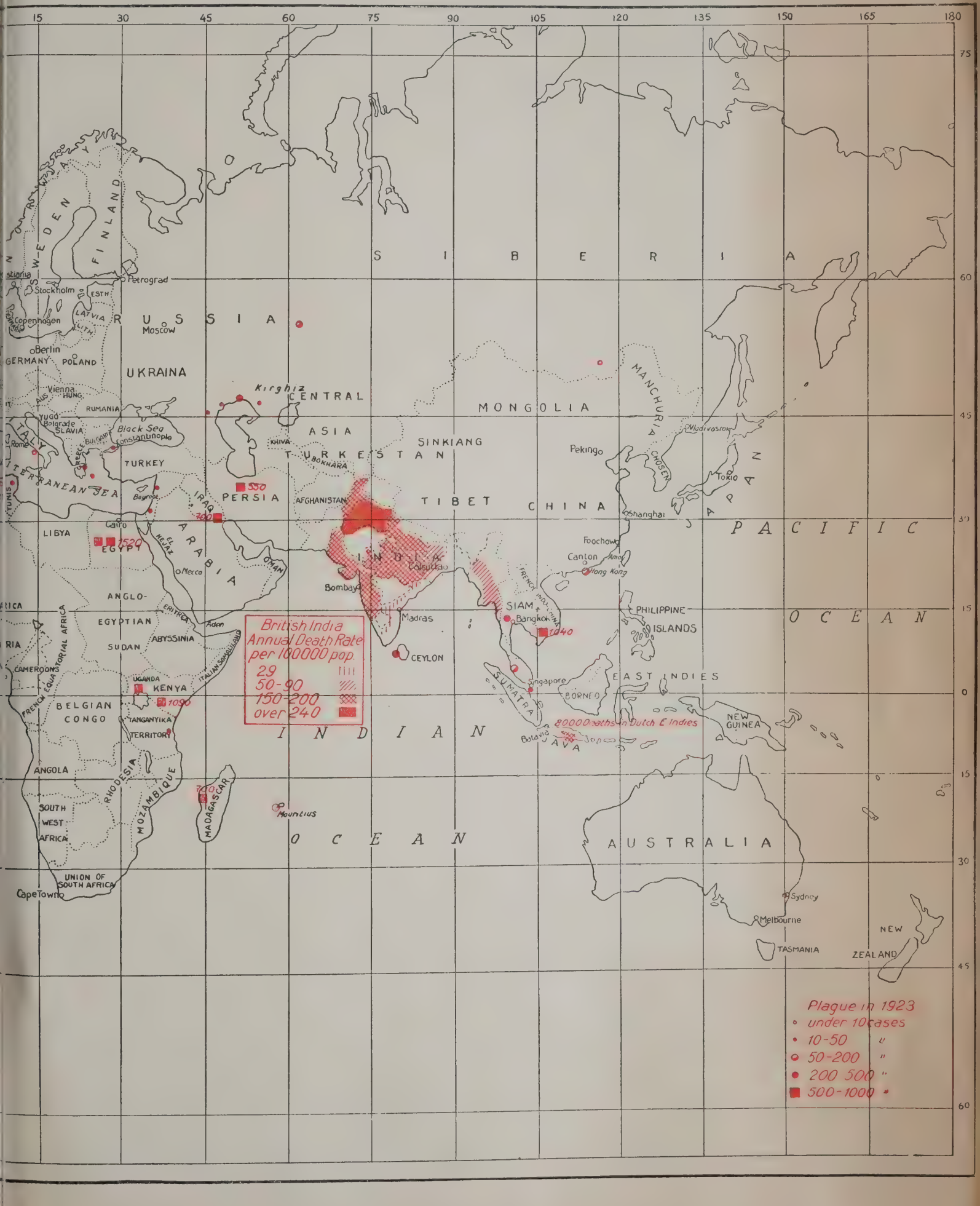
Asia.

Ceylon :				
Colombo	151	100	227	207
China :				
Canton	28	23	—	—
Amoy (Fokien Prov.)	—	254	—	33
Manchuria	—	—	—	1
Fou-Tcheou	32	19	—	—
Dutch East Indies	—	10,943	—	8,003
Hong-Kong	1,181	1,071	148	132

1. Plague Not

180
165
150
135
120
105
90
75
60
45
30
15
75
60
45
30
15
0
15
30
45
60
ALASKA
CANADA
ICELAND
BRITIS
ISLES
ATLANTIC OCEAN
Ottawa
Chicago
New York
San Francisco
UNITED STATES
Washington
Azores
Canary I.
Rio de Oro
Hawaii
MEXICO
Mexico
WEST INDIES
PACIFIC OCEAN
CENTRAL AMERICA
Panama
VENEZUELA
COLOMBIA
GUIANA
LIBERIA
ECUADOR
PERU
Lima
BRAZIL
Bahia
La Paz
BOLIVIA
PARAGUAY
Rio de Janeiro
CHILE
Santiago
ARGENTINA
Buenos Aires
URUGUAY
Montevideo

ıs in 1923.


British India
Annual Death Rate
per 100000 pop.
29
50-90
150-200
over 240
80000 deaths in Dutch E Indies
Plague in 1923
under 10 cases
10-50 "
50-200 "
200 500 "
500-1000 "
INDIA
PERSIA
ARABIA
AUSTRALIA
PACIFIC OCEAN
INDIAN OCEAN
EAST INDIES
PHILIPPINE ISLANDS
NEW GUINEA
NEW ZEALAND
TASMANIA
SIBERIA
RUSSIA
CHINA
TIBET
MONGOLIA
AFGHANISTAN
TURKEY
EGYPT
LIBYA
SUDAN
ABYSSINIA
BELGIAN CONGO
ANGOLA
RHODESIA
MOZAMBIQUE
MADAGASCAR
CEYLON
SIAM
JAVA
SUMATRA
BORNEO
Petrograd
Moscow
Berlin
Vienna
Rome
Constantinople
Cairo
Bombay
Madras
Calcutta
Bangkok
Singapore
Pekingo
Shanghai
Tokio
Vladivostok
Sydney
Melbourne
Cape Town
Mauritius
Aden
Mecca
Beyrout
Canton
Hong Kong
Foochow
Amoy
Stockholm
Copenhagen
SWEDEN
FINLAND
NORWAY
GERMANY
POLAND
UKRAINA
RUMANIA
Yugo Slavia
Belgrade
Black Sea
TUNIS
ITALY
MEDITERRANEAN SEA
IRAQ
KHIVA
BOKHARA
SINKIANG
MANCHURIA
CHOSEN
JAPAN
ESTH.
LATVIA
LITH.
AUS.
HUNG.
BULGARIA
OMAN
EL HEJAZ
ERITREA
ITALIAN SOMALILAND
FRENCH EQUATORIAL AFRICA
CAMEROONS
UGANDA
KENYA
TANGANYIKA TERRITORY
SOUTH WEST AFRICA
UNION OF SOUTH AFRICA
FRENCH INDO-CHINA
1520
1090
550
300
1040
700
15
30
45
60
75
90
105
120
135
150
165
180

Asia *(continued).*

Locality	1922 Cases	1922 Deaths	1923 Cases	1923 Deaths
British India :	—	77,116	—240,586	
Delhi	—	192	— 2,795	
Bengal	—	150	— 82	
Bihar and Orissa	—	15,100	— 28,822	
United Provinces	—	23,292	— 74,088	
Punjab	—	7,751	— 49,723	
N.-W. Frontier Provinces	—	118	— 3,738	
Central Provinces	—	6,138	— 26,297	
Madras	—	9,296	— 11,719	
Bombay	—	7,126	— 32,165	
Burma	—	7,206	— 7,628	
Jind State	—	—	— 2,271	
Bangalore	—	585	— 105	
Kolhapur State	—	162	— 153	
French Indo-China :	1,268	1,093	1,040	844
Annam	—	—	111	78
Cochin-China	—	—	85	55
Cambodia	—	—	798	235
Iraq	685	—	708	413
Palestine :	63	13	21	4
Badrani	—	—	1	—
Caiffa	—	—	2	1
Haiffa	—	—	3	—
Jaffa	—	—	15	3
Persia :				
Mohammerah City	21	—	71	45
Abadan	—	—	481	409
Siam :	—	—	399	329
Bangkok	67	52	178	156
Siberia :				
Transbaikalia, Matsiewskaya, Borzia Station, Haranhor	11	9	8	1
Straits Settlements :				
Singapore	39	39	55	60
Syria :	54	2	21	—
Beyrut	37	1	20	—
Mount Libanon	—	—	1	—

Australia.

Sydney	—	—	3	3

Europe.

France :				
St Ouen, suburb of Paris	4	2	14	—
Greece :	—	—	41	6
Athens	present	—	4	—
Piræus	—	—	26	—
Lamia	—	—	1	—
Syra	—	—	10	6
Italy :	20	—	1	—
Torre Annunziata	18	—	1	—
Portugal :				
Lisbon	21	18	15	2
Oporto	—	—	—	1
St. Michel Island	—	—	200	84
Castelo Bianco	—	—	2	—
Horta	—	—	1	—

Europe *(continued).*

Locality	1922 Cases	1922 Deaths	1923 Cases	1923 Deaths
Russia :				
Kalmuk Region	24	17	11	7
" "		(July)	(July 14-25)	
			30	16
			(Dec. 8-Feb. 18, 1924)	
Government of Bukejev	—	14	334	310
		(Dec)	(Oct.1-Mar.8,1924)	
Ural Region	—	—	90	89
			(Oct. 19-Feb. 5, 1924)	
Government of Astrakan	—	—	14	14
Kirghiz Region	23	10	—	—
Spain :	12	6	52	—
Barcelona	8	6	1	—
Mijas	—	—	2	—
Malaga	—	—	49	—
Carthagena	2	—	—	—
Valencia	2	—	—	—
Turkey :				
Constantinople	29	10	12	3

Europe.

Cases of plague were notified, according to official reports, only in Turkey, Greece, Italy, France, Spain, Portugal and Russia.

Turkey in Europe. — 12 cases with 3 deaths were notified during 1923 in Constantinople as against 29 cases with 10 deaths in 1922.

Greece. — 41 cases with 6 deaths were reported from the following localities: 4 cases in Athens, 1 case in Lamia, 26 cases in Piræus and 10 cases with 6 deaths in the Island of Syra. Plague was present in Greece during 1922, but no details have been received.

Italy. — A single case was diagnosed during 1923 at Torre Annunziata, where 18 cases were notified in 1922.

Spain. — 52 cases were notified, of which 1 was in Barcelona, 2 in Mijas and 49 in Malaga. During 1922, 12 cases with 6 deaths were reported (8 cases with 6 deaths from Barcelona, and two cases each from Carthagena and Valencia).

France. — 14 cases of plague were reported from Saint-Ouen, a suburb of Paris, where 4 cases with 2 deaths were notified during 1922.

Portugal (continental). — 15 cases with 2 deaths occurred in Lisbon and 1 death in Oporto, as against 21 cases and 18 deaths in 1922 in Lisbon.

Portugal (Azores Islands). — 200 cases with 84 deaths were notified on the Island Saint-Michel, 2 cases in Castelo Bianco and 1 case in Horta.

Russia. — Outbreaks of plague were reported from several localities in South-Eastern Russia and in the Kirghiz Republic.

The Kalmuk region was visited by plague twice during 1923, first from July 14th to July 25th, when 11 cases and 7 deaths were notified. During the second outbreak, which lasted from December 8th, 1923, to February 18th, 1924, 6 centres of infection were discovered and 30 cases reported, 16 of which terminated fatally. In the Kirghiz Republic, 68 communities of the Government of Bukejev were found to be infected and 334 cases with 310 deaths were notified from October 1st to March 8th, 1924. Six communities were reported infected in the Ural

region, and 90 cases with 89 deaths were reported from October 19th, 1923, to February 5th, 1924. The latter cases were reported to be of pneumonic type. In the Government of Astrakan, 14 cases, all fatal, were notified from 3 infected communities from December 24th, 1923, to February 16th, 1924. During 1922, only three outbreaks were noted in South-Eastern Russia. The first in the Kirghiz Republic (23 cases with 10 deaths); the second in the Kalmuk region in July (24 cases and 17 deaths); the third in Bukejev in December 1922 (14 fatal cases said to be of pneumonic plague).

Asia.

Palestine. — 21 cases with 4 deaths were reported during 1923 from the following localities: *Badrani*, 1 case; *Caiffa*, 2 cases, 1 death; *Haiffa*, 3 cases and *Jaffa*, 15 cases, 3 deaths. During 1922 there were localised outbreaks of plague in the summer amounting to 63 cases with 13 deaths.

Syria. — 20 cases were notified in Beyrut and 1 case in Mount Liban.

Iraq. — 708 cases, with 413 deaths, were reported in 1923 as against 685 cases in 1922 and 137 cases in 1921.

Persia. — 71 cases with 45 deaths were reported in the City of Mohammerah and 481 cases with 409 deaths in the City of Abadan.

Ceylon. — 227 cases were reported in the city of Colombo as against 151 cases the previous year.

India. — In each province in India plague has a characteristic and constant seasonal prevalence and in the majority of these provinces the close of the calendar year is synchronous with an upward trend of the epidemic curve. To facilitate comparison of the severity of different epidemics it has become customary, therefore, to discuss the incidence of the disease in "plague years", counting from July 1st to the end of June. June and July are in all provinces, excepting Burma, months of minimal plague prevalence.

Succeeding epidemics of plague in India vary in severity within very large limits. The outbreak of 1923-24, notably in the Punjab, has been very much more severe than recent outbreaks, but that there has been a general marked tendency to diminished prevalence in the most severely affected provinces is shown in the following table, which gives the total plague mortality for quinquennial periods for India as a whole and for the chief plague-infected administrative areas :

PLAGUE MORTALITY FOR QUINQUENNIAL PERIODS IN CERTAIN PROVINCES OF INDIA, 1898-1923

Provinces	Population Census 1921	1898–1903	1903–1908	1908–1913	1913–1918	1918–1923	Total for 25 years
Punjab	20,678,393	439,627	1,647,603	471,350	433,586	69,340	3,061,506
United Provinces	45,590,946	115,071	1,002,332	740,288	528,641	154,763	2,541,095
Bombay Presidency	19,338,586	759,778	824,484	247,185	463,774	61,080	2,356,301
Central Provinces	13,908,514	30,828	141,085	100,175	106,553	56,505	435,146
Bihar and Orissa	33,998,778	174,449	345,175	216,351	219,776	90,482	1,046,233
Madras	42,322,270	24,658	36,948	34,292	56,782	50,058	202,738
Burma	13,205,564	16	26,394	28,453	35,869	29,081	119,813
Total, India :	319,075,132	1,707,456	4,325,237	2,042,127	2,179,401	530,170	10,822,331

The very marked decline in India as a whole and in the severely affected provinces is very noteworthy, as is the persistent infection in the mildly infected provinces of Madras and Burma.

DEATHS FROM PLAGUE IN INDIA, 1919-1923

Provinces	1919–1920	1920–1921	1921–1922	1922–1923	Total for 25 plague years	Mean annual incidence for the 25 plague years, 1898–1923
Punjab	6,552	1,959	7,876	41,703	3,061,506	122,460
United Provinces	23,483	25,374	12,039	76,311	2,541,095	101,643
Bombay	12,344	9,926	4,606	14,821	2,356,301	94,252
Bihar and Orissa	18,682	17,202	8,559	29,519	1,046,233	41,849
Central Provinces	17.972	4,149	7,561	23,603	435,146	17,406
Madras	6,875	18,217	7,179	11,441	202,738	8,109
Burma	5,464	3,964	6,517	8,154	119,813	4,792
Bengal	77	58	136	80	69,721	2,789
Central India	3,972	374	239	816	148,753	5,950
Hyderabad	20,861	9,404	733	9,792	300,215	12,089
Mysore	5,269	9,675	6,771	5,797	256,734	10,269
Rajputana	42	849	4	—	278,238	11,129
Delhi	—	—	—	2,574	2,574*	—
Jind State	—	—	—	1,822	1,822*	—
North-West Frontier Provinces	—	—	—	937	937*	—
Bengalore	—	—	—	468	468*	—
Kolhapur State	—	—	—	37	37*	—
	121,593	101,151	62,220	227,875	10,822,331	432,737

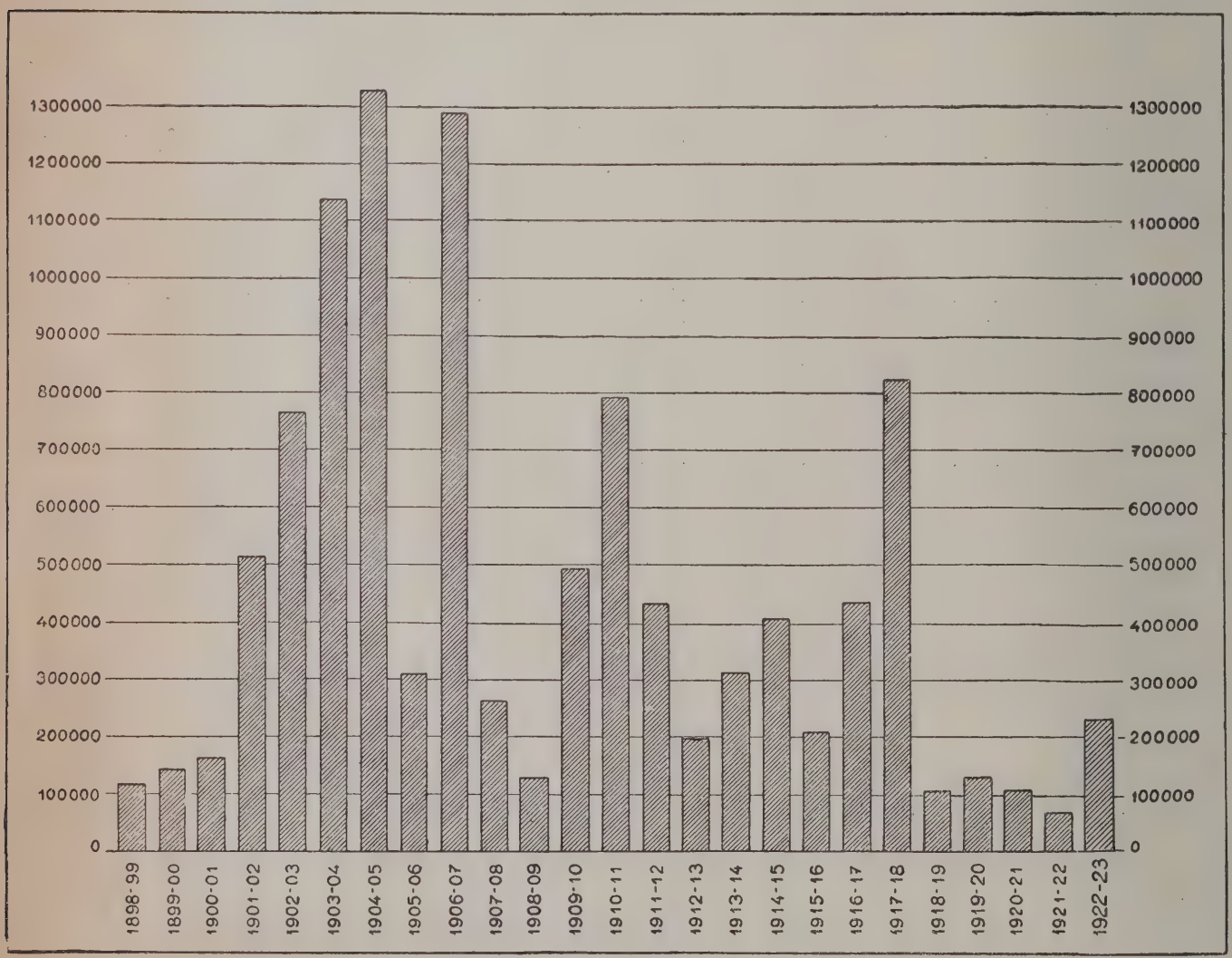
* Plague-year 1922-1923 only.

Weekly data, which would best illustrate the seasonal fluctuation of plague in each province, are available only in provisional and incomplete form; the following table indicates, therefore, the deaths merely by quarters in the more important provinces

Seasonal Distribution of Deaths from Plague in India

Provinces	Quarters of 1923				Total 1923	Quarterly average for 25 years				Annual average for 25 years
	I.	II.	III.	IV.		I.	II.	III.	IV.	
Bengal	—	80	2	—	82	1,187	1,354	137	111	2,789
Bihar and Orissa	20,357	7,131	119	1,215	28,822	27,261	10,031	591	3,937	41,821
United Provinces	53,239	16,442	303	4,104	74,088	59,615	30,276	1,205	10,459	101,555
Punjab	7,496	33,743	1,322	7,162	49,723	38,687	77,011	880	6,203	122,781
Central Provinces	18,241	1,843	2,056	4,157	26,297	9,372	1,302	1,748	5,091	17,514
Madras	5,286	884	3,123	2,426	11,719	3,314	342	1,564	2,901	8,121
Bombay	6,241	3,103	10,052	12,769	32,165	28,736	9,680	21,667	34,862	94,946
Burma	4,626	1,094	630	1,278	7,628	2,496	981	728	567	4,772

2. Plague Mortality in India, 1898-1923.



Singapore. — 60 deaths from plague were notified during 1923 as against 39 in 1922 and 28 in 1921.

Dutch East Indies. — 8,003 deaths from plague were recorded in 1923 as against 10,943 in 1922, 9,727 in 1921 and 8,918 in 1920. The seasonal distribution was as follows:

January	1,039	May	471	September	578
February	818	June	441	October	902
March	685	July	469	November	942
April	487	August	507	December	1,064

The highest number of cases were returned from Soerakarta, Samarang, Koëdoe and Pekalongan, all in Central Java.

Hong-Kong. — 148 cases of plague with 132 deaths were notified in 1923 as compared with 1,181 cases in 1922, 150 in 1921 and 138 in 1920. The disease was, as usual, most prevalent during the latter half of May and June. The last plague case in 1923 was reported October 6th.

China. — 33 deaths were reported from Amoy in Fokien Province and one fatal case from Manchuria.

French Indo-China. — 1,040 cases, resulting in 844 deaths, were recorded in 1923 as against 1,268 cases with 1,093 deaths in 1922 and 1,099 cases with 947 deaths in 1921.

The regional distribution during 1923 was as follows:-

	Population	*Cases*	*Deaths*
Annam	4,933,000	111	78
Cochin-China	3,796,000	85	55
Cambodia	2,403,000	798	235
Tongking and Kwang-Teheou-Wan	6,850,000	91	41
Laos	819,000	0	0

Laos was, as in previous years, free from plague. The highest number of cases were notified in the large town and river port Pnom Penh in Cambodia (628 cases, 98 deaths) which has been considered as the most important endemic centre of plague in Indo-China.

Siam. — The number of reported cases and deaths during 1923 was 399 and 329 respectively. About half of these (178 cases and 156 deaths) occurred in Bangkok. The plague incidence reached its maximum in February and March and its minimum during the last three months of the year.

Siberia. — 8 cases and 1 death were notified during 1923 from Transbaikalia, from Matsiewskaya and Borzia Station and from Haranhor. During 1922, 11 cases, of which 9 proved fatal, were reported from the same region.

Africa.

Canary Islands. — 46 cases with 27 deaths of plague were notified in 1923, of which 34 cases with 27 deaths in Las Palmas, 10 cases in Tenerife and 2 cases in San Juan de la Rambla.

Cape Verde Islands. — 56 cases with 18 deaths were notified on the Island of St. Vincent from May 5th to July 29th.

Algeria. — 3 cases with 2 deaths were returned from Algiers, 2 cases from Oran, and 1 fatal case from St. Eugène.

Morocco. — There were notified altogether 134 cases in Morocco, namely, 2 cases in Casablanca, 5 in Rabat Region, and 127 in the Gharb Region, where 110 cases occurred in the Camp of Messerah.

Tunisia. — 29 cases occurred in April in Ben Gardane, and 2 cases were discovered in Tunis during the summer.

Egypt. — Plague was relatively severe in Egypt during 1923, 1,519 cases and 725 deaths having been reported. The incidence of the disease during the last five years is indicated by the following figures :

	Cases	*Deaths*
1919	877	473
1920	463	269
1921	356	153
1922	487	228
1923	1,519	725

GEOGRAPHICAL DISTRIBUTION OF PLAGUE IN EGYPT, 1921-1923.

Provinces	1921		1922		1923	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Lower Egypt:						
Governorates						
Cairo	0	0	0	0	2	2
Alexandria	137	46	71	36	67	33
Port Said	33	17	54	35	51	28
Suez	93	58	58	33	47	24
Ismailia	0	0	1	1	0	0
Provinces :						
Gharbiya	30	2	60	16	24	10
Daqahliya	0	0	1	1	2	2
Minufiya	0	0	1	1	292	97
Qalyubuya	0	0	1	1	74	10
Sharkiya	1	0	0	0	0	0
Upper Egypt:						
Beni Suef	1	1	62	21	64	22
Giza	0	0	0	0	3	3
El Faiyum	1	1	33	11	34	11
El Minya	29	8	87	39	107	48
Asyut	20	12	47	28	358	203
Girga	10	7	9	3	342	197
Qena	1	1	1	1	52	35
Aswan	0	0	1	1	0	0
Totals	356	153	487	228	1,519	725

SEASONAL VARIATIONS OF PLAGUE IN EGYPT, 1921-23.

Months	1921		1922		4-week periods	1923	
	Cases	Deaths	Cases	Deaths		Cases	Deaths
January	11	9	12	6	1st	3	2
February	14	6	23	12	2nd	11	7
March	23	12	21	8	3rd	89	46
April	51	23	39	17	4th	295	148
May	36	17	60	30	5th	371	221
June	41	11	131	48	6th	267	116
July	60	23	112	56	7th	155	60
August	28	6	30	19	8th	102	36
September	37	19	13	9	9th	48	15
October	18	9	16	9	10th	21	10
November	13	5	23	10	11th	51	25
December	24	13	7	4	12th	35	10
					13th	71	29
Totals	356	153	487	228		1,519	725

REPORTED TYPE OF PLAGUE CASES NOTIFIED IN EGYPT, 1921-1923.

Years	New cases			Died in hospitals [1]			Died outside hospitals [1]			Total	
	B.	S.	Pn.	B.	S.	Pn.	B.	S.	Pn.	Cases	Deaths
1923	285	5	6	83	4	6	46	7	7	356	153
1922	382	6	2		123 [2]		66	23	8	487	228
1921	1,122	44	48	333	39	48	94	139	72	1,519	725

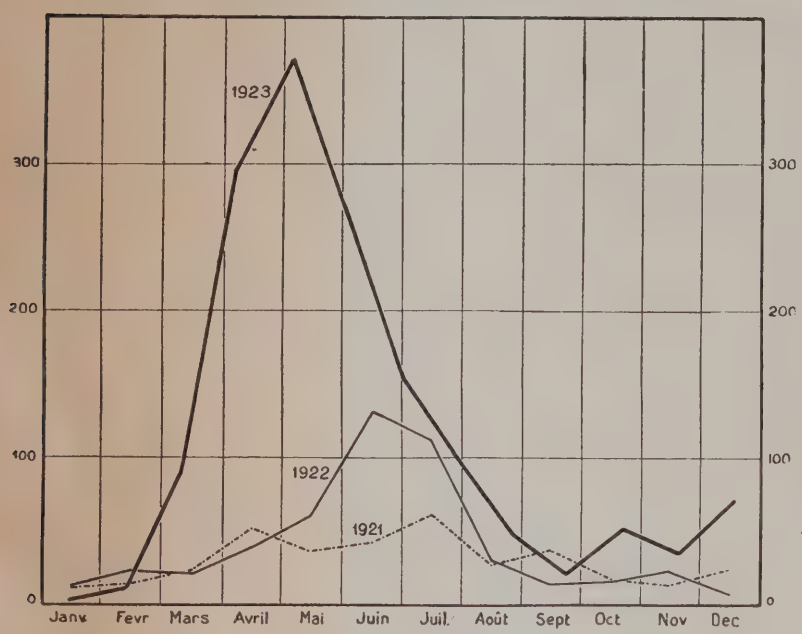
[1] Not comprised in column of new cases.
[2] Type not specified.

B : Bubonic plague.
S : Septicæmic plague.
Pn : Pneumonic plague.

NATIONALITY OF PLAGUE PATIENTS, 1921-1923.

	1921		1922		1923	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Natives	336	145	462	213	1,501	720
Foreigners	20	8	25	15	18	5
Totals . . .	356	153	487	228	1,519	725

3. Cases of Plague notified in Egypt, 1921-1923.



It will be noted that the comparative severity of plague in 1923 was most marked in certain provinces of Upper Egypt, a fact that accounts for the early rise in the epidemic curve that characterised the outbreak.

In certain districts of Upper Egypt pneumonic plague cases are much more commonly reported than from the rest of the country. Of the 725 plague deaths reported in Egypt in 1923, 427 deaths were ascribed to the bubonic form of the disease; 178 septicæmic and 120 pneumonic. Of the 120 fatal pneumonic plague cases (of which only 48 died in hospitals), 104 were reported from the three provinces of Upper Egypt : Asyut, Girga and El Minya, in which the total plague cases and deaths reported were 807 and 448 respectively. The figures indicate that the case mortality rate of the non-pneumonic cases in these three provinces was 48.9 per cent., a low figure for an oriental population, though not so low as in Lower Egypt, where the plague case mortality rate was only 36.8 per cent.

In spite of the comparative frequency of the pneumonic form of the disease, plague in Egypt appears to be a milder disease than it is reported to be in British India and the Dutch East Indies.

Senegal. — The course of plague prevalence during the last five years is indicated by the following returns:

Years	*Cases*	*Deaths*
1919	5,761	4,276
1920	7,999	5,879
1921	1,799	1,241
1922	750	428
1923	1,221	846*

* Incomplete data.

1,221 cases with 846 deaths were officially recorded from January to November 30th in the following localities: Dakar, 17 cases, 5 deaths; Rufisque, 294 cases with 236 deaths; Thies, 349 cases, 234 deaths; Baol, 11 cases, 12 deaths; Cayor, 404 cases, 216 deaths; and 133 cases with 139 deaths in Sine Saloum. The highest prevalence observed in the months June, July and August, when 804 cases with 605 deaths occurred.

Uganda. — 948 cases with 914 deaths were reported in 1923, the maximum prevalence being in June, July and August. The incidence was relatively low, as is seen from the following table giving the number of deaths reported as due to plague during the last seven years:

Years	*Deaths*	*Years*	*Deaths*
1917	4,031	1920	1,732
1918	2,493	1921	5,871
1919	1,022	1922	1,305
		1923	948

Tanganyika Territory. — 36 cases and 74 deaths from plague were reported, indicating incomplete returns. The deaths were returned from Singida, a sub-district of Dodoma, where plague has existed since 1918 and where 30 cases with 23 deaths were notified during 1922 and 149 deaths during 1921.

Madagascar. — 698 cases with 479 deaths were notified in 1923 from the following districts:

Tananarive, 690 cases with 472 deaths; Diego-Suarez, 5 cases, 4 deaths; Antsirabe, 2 fatal cases, and 1 fatal case in Tamatave.

Mauritius Island. — 139 cases with 119 deaths were recorded during 1923.

Plague has practically never disappeared from Mauritius since it was introduced in 1898.

CASES OF PLAGUE NOTIFIED IN MAURITIUS, 1899-1923.

Years	*Cases*	*Years*	*Cases*
1899	919	1907	126
1900	733	1908	138
1901	815	1909	250
1902	337	1910	376
1903	978	1911	61
1904	354	1912	445
1905	202	1913	194
1906	403	1914	72

No official records are available for the war period.

Years	*Cases*
1921	375
1922	98
1923	139

In 1920 the Island was reported to be free from human plague and the rats examined showed no infection.

A new epidemic broke out in 1921, reaching its maximum in November.

Union of South Africa. — 20 cases with 12 deaths occurred in 1923 as against 10 cases with 8 deaths in 1922. Plague is said to have been introduced from the infected ports of South America and India, several times since 1900. From 1910 to 1921 inclusive, 268 cases with 180 deaths were notified, of which 29 cases and 17 deaths were among the white population and 239 cases and 163 deaths among the natives.

The 1921 outbreak (33 cases with 16 deaths) occurred in the Orange Free State, in Hoopstad, Bothaville and Kroonstad districts. The existence

of epizootic plague in wild rodents — chiefly gerbilles, multi-mammate mice, malacothrix and veld rats (*arvrcanthus pumilio*) — was established. This is believed to be the cause of the outbreaks which have been noted frequently since 1916 in this region.

The Colony and Protectorate of Kenya. — 1,090 cases were reported from the whole Territory in 1923. As far as may be judged from the reports, the province Nyanza seems to have been the most affected area, particularly the district North Kanironda being heavily infected. The epidemic commenced rather suddenly in June, when 386 cases were reported and it declined gradually from this date to November, when a recrudescence was observed. All the provinces of the Colony and Protectorate have suffered from more or less extensive epidemics in 1920, 1921 and 1922. For example, North Kawironda in the Nyanza Province reported, during 1920, 1,500 deaths from plague, while small outbreaks were reported from Uhamba, Kenya, Naivasha and Seyidie Provinces during 1920-1922. The natives chiefly were affected, the cases among Europeans being accidental or incidental to a particular occupation. It is said that the black rat (*Rattus rattus Kijabius*) was of great importance in the transmission of the disease.

South-America.

Plague was confined, in 1923, to South America and Mexico, the most important outbreaks being in Peru and Ecuador.

Peru. — An endemic area of plague exists in Peru, as may be seen from the following table:

Cases of Plague notified in Peru, 1918-1923

Years	*Cases*	*Deaths*
1918	823	389
1919	654	340
1920	758	392
1921	413	205
1922	839	379
1923	870	408

Seasonal Variation of Plague in Peru.

	1922		1923	
	Cases	*Deaths*	*Cases*	*Deaths*
January	65	29	205	85
February	76	33	150	72
March	74	46	128	55
April	73	32	136	62
May	83	51	67	24
June	87	15	75	49
July	63	35	29	15
August	32	16	11	5
September	39	17	13	8
October	48	12	16	8
November	83	42	25	19
December	116	51	15	6
	839	379	870	408

Plague in Peru, by Districts, in 1923.

Districts	*Cases*	*Deaths*
Ancash	6	0
Arequipa	2	1
Cajamarca	138	47
Callao	15	9
Lambayeque	78	51
Libertad	185	90
Lima	294	136
Piura	152	74
Total in Peru	870	408

Ecuador. — 126 cases with 42 deaths were recorded during 1923 as against 56 cases in 1922 and 290 cases in 1921. The City of Guayaquil returned most of the reported cases (88 cases, 26 deaths); other centres of infections were Guamote, Ambato, Santa Ana and Chongon.

Seasonal Variation of Plague in Ecuador, 1921-1923.

	1921	1922	1923	
	Cases	*Cases*	*Cases*	*Deaths*
January	93	20	5	1
February	82	11	14	4
March	37	12	15	6
April	13	1	1	2
May	9	1	1	1
June	1	0	0	0
July	1	0	5	5
August	2	0	13	2
September	6	0	8	1
October	6	2	15	6
November	11	1	7	3
December	9	8	42	11
Total	290	56	126	42

Bolivia. — Four deaths from plague were reported in La Paz from September 1st to October 31st, 1923.

Argentine Republic. — Eight cases with three deaths were notified in February in Rosario.

Uruguay. — Three cases with one death were notified.

Paraguay. — Six cases with four deaths were notified in the City of Asuncion.

Brazil. — Fourteen cases with nine deaths occurred in Bahia; sixteen cases with four deaths in Pernambuco; one case in Vino del Milagro, and 22 cases with 21 deaths in Porto Alegre. Plague was confined, in 1923, to the same localities as in 1922 when, in addition, one fatal case was reported in Rio de Janeiro.

Venezuela. — Four cases with two deaths were reported in May, 1923, from Victoria.

Mexico. — Two cases with one death were diagnosed in March in the port of Tampico.

Australia and Oceania.

Hawaii. — A single fatal case was reported, in September 1923, from Honokoa, in *Hawaii*.

Australia. — Three cases, all fatal, were notified in Sidney from June 16th to July 7th.

CHOLERA

The year 1923 witnessed a general and marked decrease of cholera. The death-toll in India, although still considerable, was the lowest on record and the disease nearly disappeared from other areas, notably Russia, where it had prevailed most seriously during the two preceding years. An increased incidence was reported only from Iraq and Persia.

Cases of Cholera notified throughout the World in the year 1923 and compared with 1922.

Europe.

	1922		1923	
	Cases	*Deaths*	*Cases*	*Deaths*
Poland	121	34	0	0
Roumania	19	(*a*)	0	0

a Not available.

4. Cholera and Yellow Fe

otifications in 1923.

	1922		1923	
	Cases	*Deaths*	*Cases*	*Deaths*
Russia: Total	86,178	—	114	—
Northern Region	235	—	0	—
Western ,,	191	—	0	—
Central ,,	606	—	3	—
Middle Volga ,,	1,113	—	0	—
South Central ,,	1,644	—	0	—
Ukraine	41,903	—	12	—
Southern Region	11,251	—	86	—
Transcaucasia	675	—	0	—
Crimea	2,835	—	0	—
Eastern Region	2,523	—	3	—
Kirghiz Republic	8,935	—	0	—
Turkestan Republic	2,522	—	8	—
Siberia	9,308	—	0	—
Railways and Waterways	2,412	—	2	—
Prisons	25	—	0	—

Asia.

	1922		1923	
	Cases	*Deaths*	*Cases*	*Deaths*
Iraq	0	0	1,503	1,098
Persia:				
Mohammerah	7	2	55	27
Assara	21	0	—	—
Abadan	—	—	—	992
Ahwag	—	—	—	2
Ahouaz	—	—	11	8
India: Total	—	118,703	—	72,695
Bengal	—	51,383	—	41,483
Delhi	—	12	—	10
Bihar and Orissa	—	26,635	—	8.130
Assam	—	15,565	—	3,825
United Provinces	—	2,330	—	2,595
Punjab	—	129	—	0
North West Frontier Province	—	0	—	0
Central Provinces	—	74	—	1,090
Madras Presidency	—	15,321	—	4,929
Bombay	—	2,758	—	8,735
Burma	—	4,496	—	1,825
Kolhapur State	—	0	—	73
Siam	—	47	(*)	82
Indo China	1,737	970	310	154
Japan	730	417	1	—
Fed. Malay States	3	—	22	18
Philippine Islands	165	72	28	15
China:				
Shanghai	331	84	—	67
Canton	258	58	1	—
Hong-Kong	1	1	1	—

Europe.

No case of cholera was reported, during 1923, in Europe, outside of Russia.

Russia. — In this country, where, during 1922, cholera was still widespread (86,178 cases), one small outbreak occurred, namely, in the city of Rostof on the Don (73 cases) and, in addition, 31 sporadic cases in widely separated localities.

* Incomplete data.

CASES OF CHOLERA NOTIFIED IN RUSSIA DURING 1922 AND 1923, ACCORDING TO GEOGRAPHICAL REGIONS.

	1922	1923
Northern Region	235	—
Western Region	191	—
Central Region	606	3
Middle Volga Region	1,113	—
South Central Region	1,644	—
Ukraine	41,903	12
Southern Region	11,251	86
Transcaucasia	675	—
Crimea	2,835	—
Eastern Region	2,523	3
Kirghiz Republic	8,935	—
Turkestan Republic	2,522	8
Siberia	9,308	—
Railways and Waterways	2,412	2
Prisons	25	—
	86,178	114

The successive waves of cholera which have swept across Russia during the last twenty years are evident in the following table:

CASES OF CHOLERA NOTIFIED IN RUSSIA, 1904-1923.

Year	*Cases*	*Year*	*Cases*
1904	9,226	1914	9,715
1905	598	1915	66,455
1906	20	1916	1,800
1907	12,703	1917	130
1908	30,705	1918	41,586
1909	22,858	1919	5,119
1910	230,232	1920	29,615
1911	3,416	1921	207,389
1912	9	1922	86,178
1913	324	1923	114

Asia.

Iraq. — No case of cholera had been recorded in Iraq during 1922, but in 1923 there were 1,503 cases and 1,098 deaths. The epidemic began in August (382 cases with 250 deaths), reached its maximum prevalence in September (773 cases with 585 deaths) and disappeared toward the end of the year. The city of *Basra* was most seriously affected.

INCIDENCE OF CHOLERA IN CERTAIN CITIES OF IRAQ IN 1923.

			Cases	*Deaths*
Amara	Sept. 10	Oct. 22	31	24
Bagdad	Aug. 6	Nov. 13	93	68
Basra	Aug. 8	Oct. 9	595	438
Kerbela	Oct. 8	Nov. 5	23	23
Kut	Oct. 2	Oct. 9	2	—
Masiryah	Jan. 1	Sept. 24	115	78

Persia. — 55 cases with 27 deaths were reported from Mohammerah, 992 deaths from Abadan, 2 deaths from Ahwag and 11 cases with 8 deaths in Ahouaz. Cholera was reported to be present also in Sumar.

India. — British India, especially the Ganges Valley, is the world's chief endemic centre of cholera. Although in 1923 it was responsible in India for not less than 72,695 deaths, representing about 97 % of the known cholera deaths in the world, this figure is nevertheless by far the lowest on record during the thirty-four years covered by our data.

DEATHS FROM CHOLERA IN INDIA, 1904-1923.

Years	*Deaths*	*Years*	*Deaths*
1904	193,457	1914	299,174
1905	442,508	1915	409,498
1906	713,664	1916	300,208
1907	413,180	1917	277,537
1908	607,278	1918	571,643
1909	242,848	1919	602,304
1910	435,077	1920	131,203
1911	356,157	1921	459,843
1912	425,192	1922	118,703
1913	311,127	1923	72,695

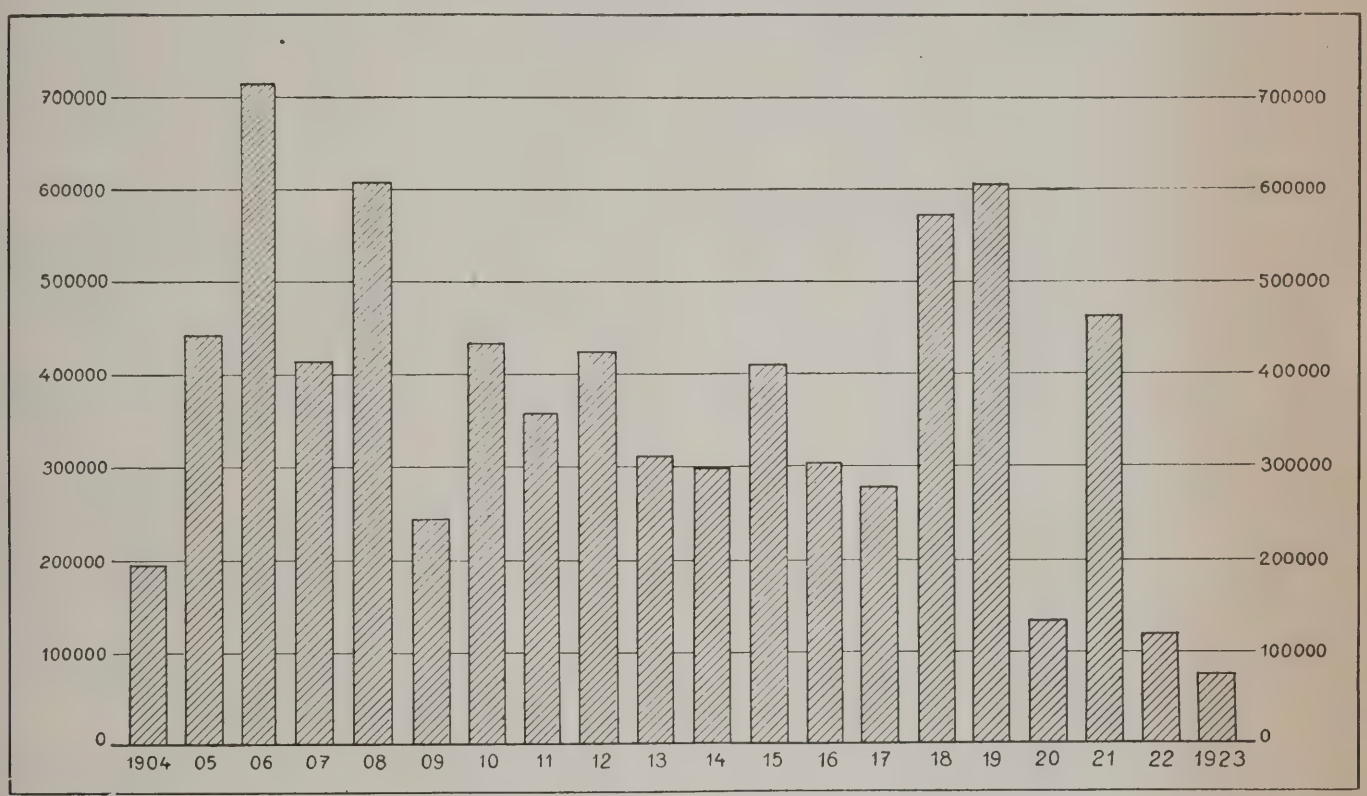
Cholera centered in Bengal, while the Punjab and the North-West Frontier Province were quite free from infection.

The incidence of cholera in *Bengal Presidency* was lower in 1923 than in any year for which complete records are available; 41,483 deaths, or 89 per 100,000 inhabitants, were reported as against 51,383 in 1922 and 80,547 in 1921. The epidemic reached its maximum in April and declined during the summer; a new increase commenced in November.

In *Bihar and Orissa* 8,130 deaths from cholera, or 24 per 100,000 population, were recorded; this is the lowest incidence since 1912. The maximum prevalence was in August.

In the *United Provinces*, which occupy the upper part of the Ganges Valley, 2,595 deaths from cholera were recorded as against 2,330 in 1922 and 149,667 in 1921. Only once before has so low a level been reached in this region.

5. Cholera Mortality in India, 1904-1923.



The provinces further to the north-west — *Delhi*, *Punjab* and the *North-West Frontier Province* — were free from cholera; serious outbreaks are not common in this region.

4,929 deaths from cholera were recorded in *Madras Presidency*, which is the lowest figure on record; the incidence of cholera has diminished regularly in this region ever since the severe epidemics of 1918 and 1919.

The incidence of cholera in *Bombay Presidency* was higher than during the previous three years, without, however, reaching true epidemic proportions. The incidence of cholera was relatively low in the eastern provinces of *Assam* and *Burma*.

Details of the cholera mortality in India during the last ten years are given in the table below:

DEATHS FROM CHOLERA IN INDIA, BY PROVINCES, 1914-1923.

Provinces	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	Total
Delhi	12	92	69	12	3	66	7	625	12	10	918
Bengal	89,224	130,679	70,836	45,021	82,739	124,949	54,199	80,547	51,383	41,483	770,700
Bihar and Orissa	32,115	88,349	90,582	109,620	205,584	104,727	26,341	90,688	26,635	8,130	782,771
Assam	9,270	26,979	13,099	10,953	14,077	33,080	2,421	12,829	15,565	3,825	142,098
United Provinces	32,498	90,508	33,300	21,440	119,746	81,365	6,952	149,667	2,330	2,595	540,401
Punjab	6,656	13,196	1,651	1,365	257	8,561	138	19,215	129	0	51,168
N.-W. Frontier Provinces	2,300	932	194	—	31	4,400	2	4,285	0	0	12,144
Central Provinces	20,345	5,662	39,205	691	3,351	62,089	3,491	58,331	74	1,090	194,329
Madras	68,449	30,098	16,735	58,939	122,263	93,262	31,139	27,064	15,321	4,929	468,199
Bombay	17,779	377	19,841	17,013	8,834	51,551	2,047	3,521	2,758	8,735	132,456
Burma	2,073	17,597	1,673	1,914	4,269	13,260	3,396	3,791	4,496	1,825	55,294
Ajmer Merwara	9	3	861	12	7	59	1	35	*	*	987
Rajputana	1,627	1,981	5,075	69	3	842	508	2,750	*	*	12,855
Hyderabad	5,893	2,072	1,475	2,579	7,200	13,321	57	1,381	*	*	33,878
Mysore	849	178	137	7,288	3,153	2,306	220	25	*	*	14,156
Coorg	—	—	1	32	1	157	6	—	0	0	197
Kolhapur State	—	—	—	—	—	—	—	—	0	73	73
Central India	10,075	795	5,474	589	485	8,309	278	5,079	*	*	31.084
	299,174	409,498	300,208	277,537	571,643	602,304	131,203	459,843	118,703	72,695	3,243,708

* Data not received.

DEATHS FROM CHOLERA IN INDIA, BY PROVINCES, IN EACH QUARTER OF 1922 AND 1923.

Provinces	1st quarter		2nd quarter		3rd quarter		4th quarter		Total per year	
	1922	1923	1922	1923	1922	1923	1922	1923	1922	1923
Bengal	14,806	9,433	23,989	14,135	4,786	3,374	7,802	14,541	51,383	41,483
Delhi	—	—	—	—	12	10	—	—	12	10
Bihar and Orissa	1,918	792	12,000	1,792	7,917	4,587	4,800	959	26,635	8,130
Assam	1,928	671	10,130	1,179	3,017	542	490	1,433	15,565	3,825
United Provinces	306	31	1,431	281	504	1,742	89	541	2,330	2,595
Punjab	—	—	34	—	84	—	11	—	129	—
N.-W. Frontier Provinces	—	—	—	—	—	—	—	—	—	—
Central Provinces	14	1	25	12	33	809	2	268	74	1,090
Madras	3,642	1,709	5,128	399	5,249	576	1,302	2,245	15,321	4,929
Bombay	34	292	505	2,907	1,545	5,155	674	381	2,758	8,735
Burma	1,220	404	2,007	838	737	112	532	471	4,496	1,825
Kolhapur State	—	—	—	—	—	73	—	—	—	73
	23,868	13,333	55,249	21,543	23,884	16,980	15,702	20,839	118,703	72,695

The incidence of cholera in the large cities of India is indicated in the table below:

DEATHS FROM CHOLERA IN THE LARGE CITIES OF INDIA, 1919-1923.

City	1919	1920	1921	1922	1923	*Popul.* Census 1921
Bombay	8,455	119	70	15	183	1,176,000
Calcutta	3,688	2,302	1,997	1,269	907	1,132,000
Rangoon	61	233	101	264	48	342,000
Madras	642	22	139	17	22	527,000

Ceylon. — Two deaths from cholera were reported in September 1923.

Siam. — The incidence of cholera was relatively low during 1923. The cholera epidemics which caused 10,277 deaths in 1919 and 2,748 deaths in 1920 nearly disappeared and caused only 42 deaths in 1921, 47 in 1922 and 82 in 1923.

French Indo China. — 310 cases with 154 deaths were recorded during 1923, as against 1,737 cases with 970 deaths in 1922. Cholera is endemic in Indo-China; there is never a month without a case of cholera being reported from one or more of the provinces. Nevertheless, both the cases and deaths showed substantial and marked declines in 1923 from the preceding few years, as will be noted from these data :

Years	*Cases*	*Deaths*
1919	6,418	4,798
1920	1,591	1,035
1921	4,482	2,838
1922	1,737	970
1923	310	154

The geographical distribution of the reported cases and deaths is as follows :

Provinces	1922		1923	
	Cases	*Deaths*	*Cases*	*Deaths*
Annam	255	124	43	17
Cochin-China	984	632	199	112
Cambodia	382	221	40	10
Laos	89	15	4	—
Tonkin	27	2	39	4

China. — 67 deaths occurred in Shanghai; one case was reported each from Canton and Hong-Kong during 1923. During the previous year, 58 deaths were reported in Shanghai, four in Among, two in Tiensin, two in Manchuria and twenty at Liutsaku.

In *Japan*, where up to 1922 cholera was present in epidemic form, only one case was reported, namely, from Semka:

Years	*Cases*	*Deaths*
1919	2,912	915
1920	4,985	3,121
1921	29	16
1922	730	417
1923	1	—

The Federated Malay States. — 22 cases with 18 deaths from cholera were reported in 1923, as against 3 cases in the preceding year.

Philippine Islands. — 28 cases with 15 deaths were reported during 1923 as against 165 cases with 72 deaths in 1922. 11 cases with 1 death occurred in Manila City, the remaining cases and deaths being scattered throughout thirteen provinces.

The deaths from cholera in the Philippine Islands during the last five years are shown in the following table :

Years	*Philippine Islands*	*Manila City*	*Provinces*
1919	18,157	352	17,805
1920	122	3	119
1921	53	23	30
1922	72	24	48
1923	15	1	14

YELLOW FEVER

The outstanding feature of the 1923 data on yellow fever is the absence of any reported case in Mexico, Central America, Ecuador, or Peru. The following significant figures for Mexico show the rapid decline of the disease in that country :

YELLOW FEVER IN MEXICO, 1920-1923.

Years	*Cases*	*Deaths*
1920	505	249
1921	115	53
1922	41	25
1923	0	0

The outbreak in Bucaramanga, *Columbia* (39 cases with 2 deaths), during May, was promptly put under observation.

In *Brazil* a total of 160 cases with 55 deaths were reported. Bahia was most affected (151 cases with 47 deaths). Three cases with 2 deaths occurred in Pernambuco, while a single case was notified from Rio de Janeiro.

Also in *French Guiana* (Ile du Salut) one case was recorded.

In *Africa* there were 26 cases and 18 deaths reported from the *Gold Coast Colony.* Four fatal cases were returned from *Dahomey*, and a single case from *Togo.*

YELLOW FEVER IN THE GOLD COAST COLONY DURING 1923.

	Cases	*Deaths*
January	4	3
February	4	2
March	5	1
April	2	3
May	4	4
June	6	4
July	1	1
August to December	—	—
	26	18

TYPHUS

Europe.

Throughout Europe the incidence of typhus was lower, with few exceptions, than during any year after the war, and the return of this disease to its pre-war level was plainly in evidence in 1923. The decline of typhus was very marked in Russia, particularly in the Ukraine, where it became secondary to malaria in importance. A very material decrease occurred also in all the European States bordering Russia, with the exception of Roumania, where an increase over the previous year was recorded. It appears that the entire region from Galicia southwards through the Balkans did not participate in the general decline of typhus. The only new outbreaks of any importance occurred in Greece and in Constantinople, which probably had some connection with the refugee situation.

The cases of typhus notified during the last five years are given below, so far as available, for those European countries where it has been of importance since the war.

CASES OF TYPHUS NOTIFIED IN CERTAIN EUROPEAN COUNTRIES, 1919-1923.

Countries	1919	1920	1921	1922	1923
European Russia (without Ukraine)	2,322,552	2,979,560	539,216	975,762	178,088
Ukraine	*	591,842	110,891	344,843	31,307
Finland	124	1	33	1	11
Esthonia	1,232	4,125	356	247	42
Latvia	*	4,631	1,288	1,480	430
Lithuania	*	5,302	3,004	3,409	830
Poland	219,088	168,097	49,547	42,724	11,185
Germany	3,549	483	533	386	27
Czechoslovakia	2,457	3,019	970	321	366
Austria	996	86	81	23	3
Hungary	*	*	73	17	385
Roumania	56,242	46,206	8,189	3,902	5,173
Kingdom of the Serbs, Croats and Slovenes	*	1,582	1,054	232	351
Bulgaria	5,671	2,885	874	488	413
Greece	*	*	*	*	7,914
Italy	6,051*a*	113	60	0	2
Spain	228**	155**	73**	80**	**68

a Largely among prisoners of war. * No data available. ** Deaths only.

The number of typhus cases reported in 1923 in other European countries were: United Kingdom, 2; Scandinavia, 0; the Netherlands, 14; France, 8.

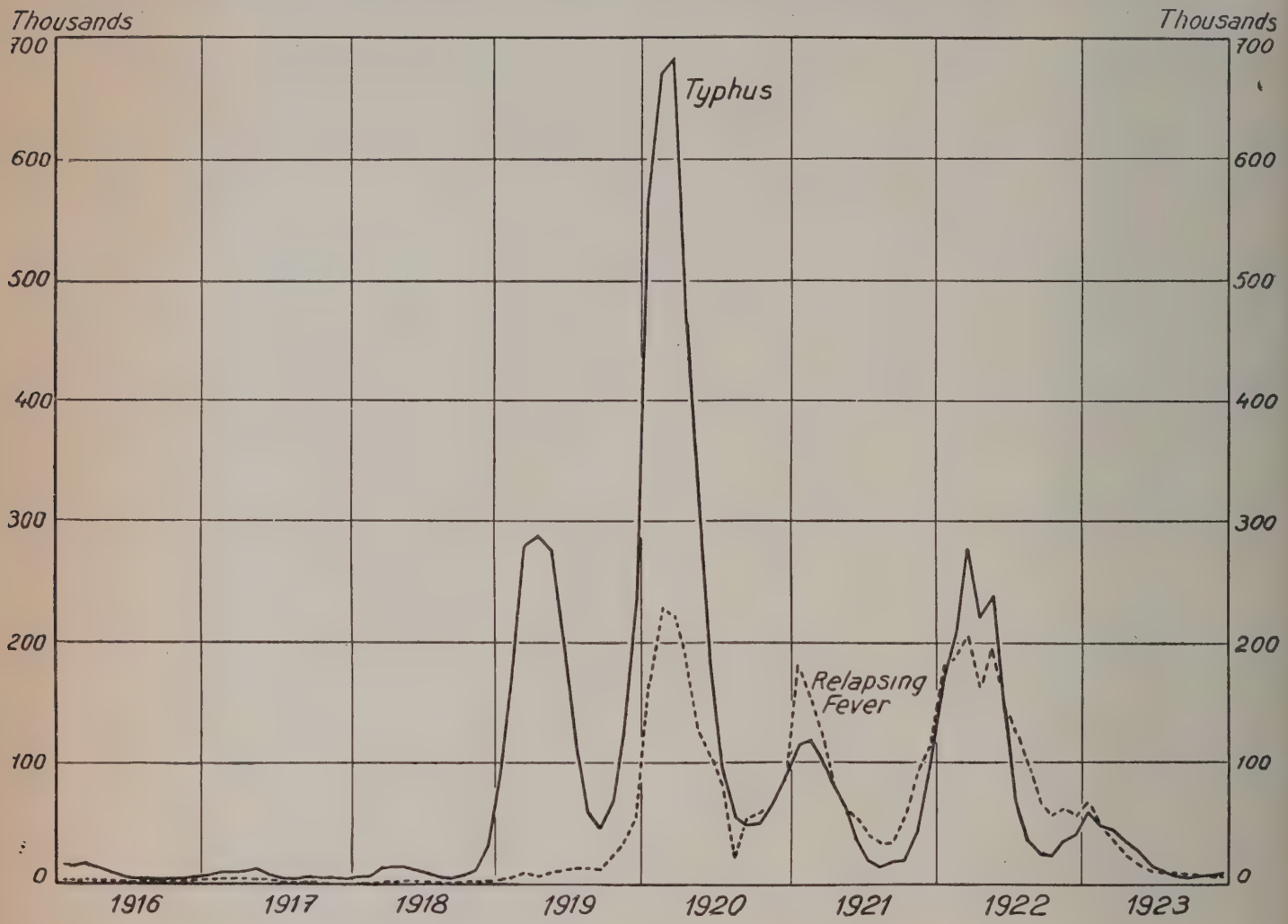
Russia. — Typhus, which, in 1922, was about twice as prevalent in Russia as in 1921, remained widespread during the autumn, but the winter increase was far less important than during the previous years. While in 1922 the number of cases reported in March, the month of maximum incidence that year, was 21 times as high as the minimum monthly figure for 1921, the increase from the minimum of 1922 to the maximum of 1923 was only two and one-half fold. This outbreak is, therefore, hardly more than a sequel of the 1922 epidemic, and the incidence declined each month after January. A minimum was reached, as usual, in the autumn (September) and a small increase was noted in the early winter, which did not exceed the normal in pre-war years. The number of typhus cases (7,882) notified in December 1923 was about the same as in December 1912 (7,688), and less than in 1913 (9,231). The corresponding figure for January 1924 was 14,277.

CASES OF TYPHUS NOTIFIED IN RUSSIA (WHOLE FEDERATION), BY MONTHS, 1920-1923.

	1920	1921	1922	1923
January	563,180	113,580	165,091	56,123
February	671,267	116,113	208,768	46,157
March	681,527	101,343	273,141	41,156
April	463,840	85,232	220,043	30,598
May	314,453	62,179	237,441	25,445
June	184,146	35,615	139,342	11,801
July	95,290	18,725	66,237	6,268
August	52,563	13,048	31,685	4,686
September	45,384	17,036	22,648	3,517
October	45,660	19,925	21,700	4,288
November	61,448	44,326	34,375	4,969
December	83,666	86,005	38,232	7,882

The prevalence of typhus was, in 1923, greatest in Eastern Russia, where it centered in the Ural Region, and declined toward the west and south. The greatest decline, compared with the previous year, occurred in the Ukraine. The remarkable decline of the number of typhus cases recorded on the ways of communication indicates clearly the improved situation. Evidently 1923 marks the end of the great post-war typhus pandemic in Eastern Europe, which must be regarded as an outstanding event in the annals of epidemiology.

6. Typhus and Relapsing Fever Notifications in Russia (whole Federation), 1916-1923.



CASES OF TYPHUS NOTIFIED IN RUSSIA, BY GEOGRAPHICAL REGIONS, 1922-1923.

Regions	*Population, in thousands*	*Cases* 1922	1923	*Rate per 100,000 population*
Northern region	4,310	32,081	9,968	231
Western region	9,118	52,517	10,269	113
Central region	14,741	162,338	27,437	186
Middle Volga reg.	15,482	224,400	37,626	243
Eastern region	12,264	249,144	60,162	490
S. Central region	11,668	76,457	16,456	141
Ukraine	26,070	344,843	31,307	120
Southern region	9,362	48,762	6,762	72
Transcaucasia	5,683	12,376	2,663	47
Crimea	762	14,857	828	109
Kirghiz Republic	5,069	23,087	1,512	30
Turkestan Rep.	7,202	16,884	1,249	17
Siberia	8,080	68,481	26,124	323
Railway and Waterways, Prisons		156,587	10,522	—
Total, Russia:	131,616	1,467,957	242,890	185

Poland. — In Poland also during the year there was a pronounced decline of the post-war typhus wave, only about one-fourth as many cases being registered as in 1922. The decline was much less marked in Galicia than in the rest of Poland, with the exception of the province of Vilna, where more cases were notified in 1923 than in 1922.

CASES OF TYPHUS NOTIFIED IN POLAND BY PROVINCES, 1922 AND 1923*.

	1922		1923	
Eastern Zone:	*Cases*	*Deaths*	*Cases*	*Deaths*
Bialystock	6,364	570	719	56
Nowogrodek	6,854	233	871	14
Polesia	5,853	236	531	21
Volhynia	4,620	285	370	18
Tarnopol	1,014	151	698	76
Vilna	639	27	1,574	62
	25,344	1,502	4,763	247
East Central Zone:				
Warsaw City	1,014	139	143	18
Warsaw District	1,240	80	578	50
Lublin	6,753	453	1,189	72
Livow	1,938	263	1,560	187
Stanislawow	1,606	236	1,146	161
	12,551	1,171	4,616	489
West Central Zone:				
Lodz	845	61	329	27
Kielce	1,385	146	916	68
Cracow	574	84	459	59
	2,804	291	1,704	154
Western Zone:				
Pomerania	46	5	21	2
Posen	40	4	9	
Teschen	4	1	5	1
	90	10	35	3
Total	40,789	2,974	11,118	893

* The above data were compiled from provisional weekly returns.

Baltic Republics. — Typhus has here followed the general downward trend described under Russia and Poland. The incidence increases regularly from north to south, being highest in Lithuania and, as usual, negligible in Finland.

Germany. — 27 cases only were notified as against 386 the previous year. The disease has also practically disappeared from Austria.

Czechoslovakia. — A very slight increase of typhus over the previous year was recorded. The greatest prevalence was — as in 1922 — in Sub-Carpathian Ruthenia (255 cases, 3 deaths), and in Slovasra (93 cases, 7 deaths). A few scattered cases were reported from Bohemia and Moravia.

Hungary. — 385 cases were reported in Hungary, which was nearly free from typhus in 1922.

Kingdom of the Serbs, Croats and Slovenes. — An increase of typhus occurred in Bosnia and Herzegovina, which caused the total number of notified cases to be 351 in 1923 as compared with 232 in 1922.

Cases of Typhus notified in the Kingdom of the Serbs, Croats and Slovenes, 1922-1923.

	1922		1923	
	Cases	*Deaths*	*Cases*	*Deaths*
Serbia	45	3	63	7
Croatia-Slavonia	49	3	10	2
Slovenia	—	—	—	—
Bosnia-Herzegovina	128	18	238	33
Dalmatia	—	—	7	2
Montenegro	9	2	16	1
Voivodina	1	—	17	4
	232	26	351	49

Roumania. — A definite increase in the incidence of typhus was noted also in most of Roumania. The data are combined below for each of the large historical regions:

Cases of Typhus notified in Roumania, 1922 and 1923.

	1922		1923	
Regions	*Cases*	*Deaths*	*Cases*	*Deaths*
Old Kingdom	1,216	147	1,869	217
Transylvania, etc.	154	79	139	15
Bessarabia	1,936	165	2,069	202
Bucovina	476	57	916	81
	3,782*	448*	4,993	515

The North-Eastern Provinces, Bucovina, Kischinew and Jassi, were the most seriously infected.

Bulgaria. — The number of typhus cases notified was only slightly lower than during the previous year.

Greece. — A few scattered cases and small outbreaks of typhus were recorded during the winter of 1922 at Yanina (Epirus) and at Kavalla (Eastern Macedonia). The epidemic of 1923 appears to have been caused largely by cases imported with the Greek refugees from the Pontus in December 1922. In January 1923, typhus appeared at numerous localities in the Ægean Islands, in Macedonia, Epirus, Trikalla, Achia, Elis, Arcadia, Phiotis and Phocis. The course of the epidemic at the centre — Athens and Piræus — where it was most prevalent among the refugees as well as among the residents of Greece, is shown in the following table:

* Provisional figures.

Cases of Typhus notified in Greece during 1923.

	Resident Population		*Refugees in*	
	Athens-Piræus	*Rest of Greece*	*Athens-Piræus*	*Salonica*
	Cases		*Deaths*	
January	560	650	70	2
February	720	800	41	2
March	855	1,225	86	3
April	642	496	40	4
May	523	373	26	4
June	131	280	13	2
July	65	140	7	–
August	17	30	1	–
September	18	8	1	–
October	23	3	5	–

The epidemic reached its maximum in March, and practically disappeared during the summer. The winter of 1923-24 did not bring any new outbreak of similar magnitude.

Constantinople. — An epidemic of typhus occurred in Constantinople about the same time as in Greece and probably favoured by the same abnormal conditions; the seasonal distribution is given below:

Cases of Typhus notified in Constantinople, 1923.

	Cases	*Deaths*
January	20	3
February	161	19
March	740	179
April	342	177
May	49	58
June	17	7
July	3	—
August	13	2

Asia.

Palestine and Iraq. — The number of typhus cases reported in both countries is small and diminishing:

	1921	1922	1923
Palestine	63	34	33
Iraq	61	48	20

Japan. — The incidence of typhus diminishes and is now very low:

	1919	1920	1921	1922	1923
Cases	225	66	171	23	15
Deaths	30	3	22	5	3

Africa.

Reliable data regarding the prevalence of typhus are available only from a part of the continent; the disease is notifiable in several British Colonies, but no case was recorded. A summary of the available data for the last five years is given below :

	1919	1920	1921	1922	1923
Egypt (*Cases*)	16,986	13,253	4,487	*	1,935
(*Deaths*)	5,573	3,510	1,271	*	603
Algeria (*Cases*)	649	1,078	6,390	1,233	1,666
Union of South Africa (*Cases*)	4,828	11,276	9,157	7,922	2,922
(*Deaths*)	1,122	1,791	1,140	966	437
Basutoland (*Cases*)	*	*	503	402	931
(*Deaths*)	*	*	93	70	128

* Data not available.

Algeria. — An outbreak of typhus which culminated in June occurred in the Western provinces of Constantine; cases of typhus are constantly recorded from all of the provinces.

CASES OF TYPHUS NOTIFIED IN ALGERIA, BY PROVINCES, 1922-1923.

Provinces	1922	1923
Algiers	217	329
Oran	307	102
Constantine	336	1,047
Southern Territory	287	161
Military Force	76	27
Total	1,223	1,666

Egypt. — During 1923 the incidence of typhus wa considerably lower than in recent years, but the diseas was still common in certain parts of Lower Egypt The time of maximum incidence is from March to May

Union of South Africa. — The reported incidenc of typhus is far lower than during the previous thre years; the number of cases declined monthly unt August, after which a new but smaller increas occurred. An outbreak in Basutoland reached it maximum in August. Typhus has been endemi in South Africa since 1867 and several severe epidemic have occurred.

RELAPSING FEVER

Europe.

Relapsing fever has declined even more rapidly than typhus in Eastern Europe. It appeared in epidemic form in Russia in 1919 and culminated in 1920; it prevailed again in 1922, when its maximum incidence was reached in May; since then the decline has been practically continuous, and during 1923 it returne to its normal pre-war level. In Poland relapsin fever became widespread in 1922 but soon declined so that its incidence in 1923 was only one-twentiet that of the previous year. With the exception o these two countries, only sporadic cases occurre during 1923 in Europe.

CASES OF RELAPSING FEVER NOTIFIED IN CERTAIN EUROPEAN COUNTRIES, 1919-1923.

Countries	1919	1920	1921	1922	1923
European Russia (without Ukraine)	392,546†	1,570,604†	698,147†	942,460	164,610
Ukraine	*	326,075	247,089	467,893	54,814
Poland	3,266	7,188	13,850	41,207	2,067
Esthonia	158	978	118	104	9
Latvia	*	547	275	116	10
Lithuania	*	732	1,031	910	24
Germany	*	*	53	31	4
Czechoslovakia	19	19	14	31	0
Austria	104	0	1	1	0
Kingdom of the Serbs, Croats and Slovenes	*	23	69	21	13
Roumania	*	19,452	4,663	444	152

† Including cases reported in the Army : 116,971 in 1919 ; 700,323 in 1920 ; 240,915 in 1921.
* No data available.

Russia. — The seasonal fluctuation of relapsing fever in Russia since the first great epidemic in 1920 is shown in the table below. There was an unusually heavy incidence in the early summer of 1922, probably related to the mass movement of famine refugees, while the winter of 1922-23 brought hardly any increase. The incidence at the end of the year approached the normal pre-war figures. Only 6,537 cases were notified in January 1924, indicating that the end of the post-war epidemic period had been reached.

CASES OF RELAPSING FEVER NOTIFIED IN RUSSIA (WHOLE TERRITORY), BY MONTHS, 1920-1923.

Month	1920	1921	1922	1923
January	165,885	181,050	183,526	69,401
February	229,663	153,126	186,528	47,111
March	221,895	120,238	206,109	36,848
April	187,155	84,010	162,470	25,478
May	129,413	59,884	193,012	19,990
June	106,992	53,607	159,451	12,694
July	80,527	40,692	126,590	11,009
August	21,072	32,694	98,058	10,398
September	54,928	33,928	66,188	7,564
October	58,359	53,299	56,634	7,296
November	67,890	91,388	62,827	5,338
December	86,845	115,821	56,310	5,169

(See diagram on page 18.)

Relapsing fever has been more prevalent in the South than in the North, while the contrary was true of typhus. The heaviest incidence, in 1923, was reported from the Ural Region and Siberia, while in the Ukraine only 54,814 cases were notified in 192 as compared with 467,893 in 1922.

CASES OF RELAPSING FEVER NOTIFIED IN RUSSIA BY GEOGRAPHICAL REGIONS, 1922-1923.

Regions	*Population (in 1,000's)*	*Cases*		*Rate per 100,000 pop.*
		1922	1923	
Northern	4,310	13,939	2,009	47
Western	9,118	37,416	4,116	45
Central	14,741	100,507	9,126	62
Middle Volga	15,482	169,260	29,244	189
Eastern	12,264	225,653	67,210	548
South Central	11,668	112,938	19,520	167
Ukraine	26,070	467,893	54,814	210
Southern	9,362	114,874	17,711	189
Crimea	762	8,906	457	60
Transcaucasia	5,683	9,127	1,609	28
Kirghiz	5,069	55,864	5,820	115
Turkestan	7,202	17,296	2,082	29
Siberia	8,080	70,917	28,561	353
Railways and Waterways	—	145,650	12,018	—
Prisons	—	13,317	3,874	—
Total	131,616	1,563,557	258,271	196

Poland. — Relapsing fever became prevalent in Poland in 1922, particularly in the districts to which large numbers had been repatriated from Russia. No new outbreak took place in 1923, only 2,067 cases being reported as against 41,207 the previous year. Towards the end of the year the disease had practically disappeared from Poland.

RELAPSING FEVER IN POLAND, BY DISTRICTS, 1922-1923.

	1922		1923	
	Cases	*Deaths*	*Cases*	*Deaths*
Eastern Zone:				
Bialystock	7,411	363	262	3
Nowogrodek	6,926	284	648	14
Polesia	12,871	253	330	7
Volhynia	4,863	148	221	6
Tarnopol	53	1	19	0
Vilna	784	22	280	4
	32,908	1,121	1,760	34
East Central Zone:				
Warsaw City	201	15	16	1
Warsaw district	32	0	8	0
Lublin	7,733	280	200	6
Lwow	234	37	13	2
Stanislawow	114	7	7	0
	8,314	339	244	9
West Central Zone:				
Lodz	18	1	3	0
Kielce	135	0	11	0
Cracow	51	3	11	0
	204	4	25	0
Western Zone:				
Pomerania	5	0	14	1
Posen	11	1	3	0
Teschen	0	0	0	0
	16	1	17	1

Baltic Republics. — A few sporadic cases only were recorded in 1923.

Roumania. — Relapsing fever has decreased constantly since 1919; 126 cases were notified in Bessarabia in 1923 and very few cases in the other provinces.

Constantinople. — A small outbreak occurred in March among the Greek refugees (56 cases and 4 deaths).

Africa.

Egypt. — Relapsing fever had been fairly frequent here for several years, but nearly disappeared in 1923. The number of cases and deaths reported since 1919 are given below:

	1919	1920	1921	1922	1923
Cases	3,221	2,898	1,208	*	39
Deaths	591	429	197	*	6

Gold Coast, etc. — Sporadic cases were reported from various regions of Africa, such as Tunis (2 cases), Algeria (4 cases), Nyasaland (40 cases), and Northern, Rhodesia (42 cases). A small outbreak occurred in the Gold Coast Colony in April and May, 160 cases and 3 deaths being reported for the year.

* No data available.

SMALLPOX

Europe.

Although the smallpox situation in Europe must be considered favourable in 1923, a few outbreaks occurred in countries where sanitation is very advanced. A mild type of the disease, believed to have resulted from lax enforcement of vaccination, appeared locally in epidemic form and made considerable headway in England and Switzerland. On the contrary, in Russia, since 1920, the incidence of smallpox has diminished constantly, but nevertheless this country furnished nearly five-sixths of the total number of smallpox cases notified in Europe. The disease continued to decline in the countries bordering on Russia as well as in Southern Europe, with the exception of Greece and Constantinople. Scandinavia was free from smallpox in 1923, and Central Europe nearly so. The details of its prevalence in European countries, so far as available, are indicated below.

CASES OF SMALLPOX NOTIFIED IN EUROPE, 1919-1923.

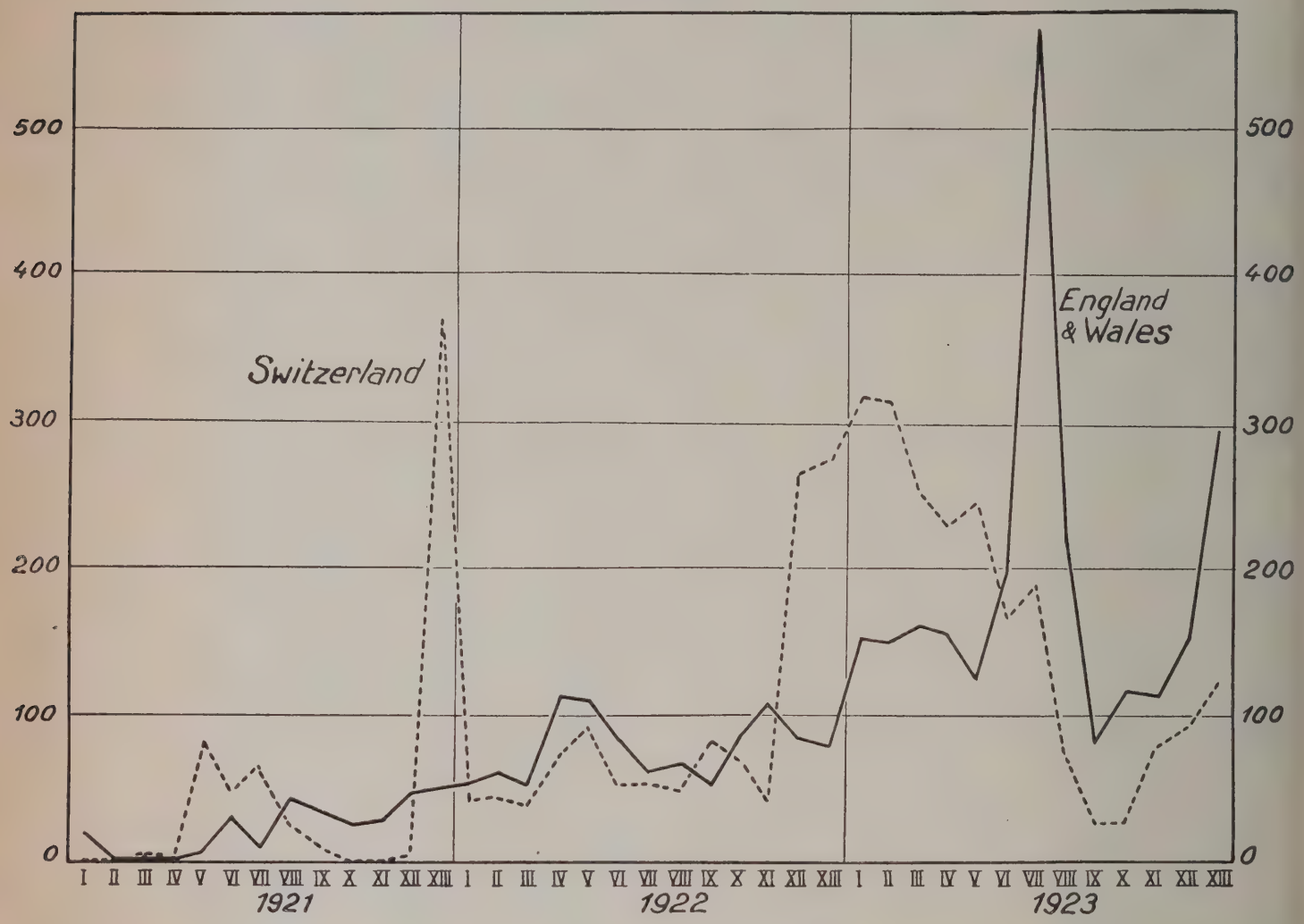
Countries	1919	1920	1921	1922	1923
England and Wales	294	263	315	973	2,485
Scotland	9	725	106	7	3
Norway	0	0	1	0	0
Sweden	7	11	2	0	0
Denmark	0	0	7	0	0
Germany	5,012	2,042	688	215	17
Netherlands	5	50	1	0	2
Belgium	*	*	21	23	31
Switzerland	3	2	596	1,159	2,145
France	572	392	341	172	195
Spain (*Deaths*)	3,620	3,280	2,087	1,332	529
Italy	34,365	26,453	4,644	534	253
Kingdom of Serbs, Croats and Slovenes	*	4,156	2,119	728	1,042
Bulgaria	874	527	22	24	20
Roumania	20,523	3,467	2,745	865	89
Hungary	*	*	131	2	9
Austria	411	253	18	4	17
Czechoslovakia	11,209	4,529	1,542	70	36
Poland	1,864	3,948	5,078	2,399	502
Lithuania	*	1,213	1,035	345	25
Latvia	*	422	255	160	23
Esthonia	267	435	141	58	21
Finland	1,759	77	27	91	12
Russia in Europe (without Ukraine)	169,545	121,587	68,503	40,839	31,311
Ukraine	*	34,730	28,123	11,095	3,710

England and Wales. — The number of smallpox cases has been increasing for several years, as shown by the following figures:

	Cases	*Deaths*	*Approximate case fatality*
1918	63	—	—
1919	294	28	9.5%
1920	263	30	11.4%
1921	315	5	1.6%
1922	917	22	2.9%
1923	2,483	7	0.3%

* No data available.

7. Cases of smallpox notified in England and Wales and in Switzerland, 1921-1923.



The disease manifested itself in a series of localised outbreaks, all of a very mild type, the most important in 1923 being in Gloucester county. The most seriously affected counties are indicated below:

Counties	*Cases* 1922	*per cent of Total*	*Cases* 1923	*per cent of Total*
York	462	46	393	15.8
Derby	231	22.8	468	18.8
Nottingham	73	7.2	434	17.5
Lancaster	52	5.1	78	3.1
London	49	4.8	11	0.4
Gloucester	—	—	935	37.7
Durham	—	—	48	1.9

All counties, with the exception of Gloucester, show the usual seasonal prevalence of smallpox, with the highest number of cases in the cold months of the year. On the contrary, the Gloucester epidemic began in March with 8 cases, increased gradually during the next two months, reaching a maximum in June and July with 279 and 295 cases, respectively — after which a marked decrease occurred, followed by a slight recrudescence in December (89 cases). For the country as a whole the smallpox incidence was more then three times as high at the end of the year than at the beginning.

Switzerland. — Smallpox has increased constantly since 1920, when only two cases were notified; there were 596 cases in 1921, 1,159 cases in 1922, and in 1923 there were reported 2,145 cases. The disease occurred in localised outbreaks, as shown by the figures below, and no case of smallpox was reported in the cantons not mentioned :

SMALLPOX CASES NOTIFIED IN THE CANTONS OF SWITZERLAND, 1922-1923.

Cantons	1922	1923
Zurich	557	242
Bern	402	1,315
Luzern	14	145
Uri	—	6
Schwyz	10	2
Glarus	21	—
Zug	2	5
Solothurn	—	41
Baselstadt	3	35
Baselland	30	30
Appenzell	—	48
St.-Gallen	29	60
Graubunden	1	—
Aargau	25	149
Thurgau	60	60
Ticino	5	2
Vaud	—	5
	1,159	2,145

The canton of Bern, which was the most seriously affected in 1923, contained over 60 % of the cases in the whole country. Zurich, which had the highest number of cases in 1922, showed a marked decline during 1923. The outbreaks were practically confined to the German-speaking cantons.

Germany. — Smallpox, which had become prevalent at the end of the war but had declined constantly ever since, nearly disappeared in 1923. The same condition was observed in *Czechoslovakia*, where only 36 cases were notified in 1923 as against 11,209 in 1919, and also in *Austria* and in *Hungary*.

Italy. — Likewise, in this country the incidence has diminished greatly — only 253 cases being notified in 1923 as against 34,365 in 1919. The cases were scattered throughout most of the territory.

Spain. — No morbidity data are available, but the mortality statistics indicate a constant decrease of the disease during the last four years. The number of deaths from smallpox was 3,620 in 1919, 3,280 in 1920, 2,087 in 1921, 1,332 in 1922, and 529 in 1923. The incidence appears, nevertheless, to remain rather high, especially on the Mediterranean littoral, where 35 deaths were recorded in Valencia, 70 in Jaen, 63 in Sevilla and 40 in Barcelona.

Greece. — An epidemic began in November 1922, up to which time about eight hundred thousand refugees had been brought to different parts of Greece. About 100 cases were recognised among the refugees from Anatolia shortly after their arrival in the camp of Stryngos, near Piræus. Although the refugees were vaccinated and the quarantine strictly enforced, the disease soon spread among the refugees and to the resident population, especially in Athens and Piræus, where 845 cases with 287 deaths were notified. Outbreaks occurred also in Epirus, and on the islands of Leukos, Samos, Chios and Mytilene. A vaccination campaign brought the epidemic under control early in the summer.

CASES OF SMALLPOX NOTIFIED IN GREECE, 1923.

Months	*Total*	*Athens-Piræus*	
	Cases	*Cases*	*Deaths*
January	200	125	75
February (1st-15)	*115	165	39
March	130	130	40
April	210	126	26
May	248	158	32
June	153	76	34
July	81	38	19
August	43	5	13
September	29	8	5
October	7	4	4
	1,216	845	287

Constantinople. — The movement of Mussulman refugees from Thrace to Constantinople gave rise to a serious epidemic of smallpox in Constantinople —under conditions similar to those in Greece. The epidemic began in October 1922, when 9 cases and 3 deaths were notified among the refugees arriving in Constantinople from Pontus. The number of cases increased to 45 with 21 deaths in November, and in the beginning of 1923 the epidemic spread rapidly, as indicated by the following figures:

SMALLPOX IN CONSTANTINOPLE, 1923.

	Cases	*Deaths*
January	369	107
February	390	112
March	1,208	336
April	352	107
May	115	52
June	42	22
July	9	6
August	7	8
Total	2.492	750

* New calendar introduced.

Kingdom of the Serbs, Croats and Slovenes. — 1,042 cases with 199 deaths were notified as against 728 cases and 165 deaths in 1922. The regional distribution is shown below:

SMALLPOX PREVALENCE, BY PROVINCES, IN THE KINGDOM OF THE SERBS, CROATS AND SLOVENES DURING 1922-1923.

	1922		1923	
Provinces	*Cases*	*Deaths*	*Cases*	*Deaths*
Serbia	409	117	175	43
Croatia-Slavonia	81	12	378	—
Slovenia	10	—	18	3
Bosnia-Herzogovina	204	28	369	50
Dalmatia	18	7	32	6
Montenegro	—	—	4	—
Voivodina	6	1	66	6
Total	728	165	1,042	199

While, in 1922, the majority of cases were reported in Serbia and in Bosnia-Herzegovina, the highest incidence occurred, in 1923, in Croatia-Slavonia. Fewer cases were notified in Serbia, but more in Bosnia-Herzegovina. The refusal of Moslem women in the latter province to submit to vaccination is said to have influenced the prevalence.

Roumania. — Smallpox diminished greatly in 1923, only 89 cases and 11 deaths being notified as against 865 cases and 153 deaths in the previous year. The disease has declined constantly since the outbreak in 1919, when 20,523 cases were notified.

Poland. — 502 cases and 83 deaths were notified as against 2,399 cases and 519 deaths in 1922. The district of Stanislavow in Eastern Galicia showed the highest incidence in both years, but without such definite concentration in the Eastern province as occurred with typhus.

Russia. — The number of smallpox cases notified has steadily declined since 1919, when the compulsory vaccination law was passed. The decrease was marked, in 1923, in the whole territory of Russia, except in the Northern Region and Siberia, where a considerable increase took place. The regional distribution is shown below:

CASES OF SMALLPOX NOTIFIED IN RUSSIA, 1922-1923.

	Number of Cases		*Rate per 10,000 population*	
Regions	1922	1923	1922	1923
Northern	3,634	9,794	84	227
Western	1,427	834	16	9
Central	5,635	2,192	38	15
Middle Volga	7,035	4,772	45	31
Eastern	7,912	6,370	71	52
So. Central	4,485	2,240	38	19
Southern	6,760	2,459	72	26
Ukraine	11,095	3,710	43	14
Crimea	768	472	101	62
Transcaucasia	3,261	734	57	13
Siberia	2,454	7,221	30	89
Kirghiz	3,838	940	69	18
Turkestan	1,163	710	16	10
Railways, Waterways	3,174	2,163	—	—
Prisons	9	15	—	—
Total	62,650	44,626	48	34

The maximum incidence of the disease occurred, as usual, in March, and the number of cases reported during the last quarter of 1923 was far below the corresponding figures for the previous year. The seasonal distribution is indicated below.

SEASONAL VARIATIONS OF SMALLPOX IN RUSSIA, 1922-1923.

Cases in 1922	*European Russia*	*Caucasus*	*Siberia*	*Kirghiz Republic*	*Turkestan Republic*	*Railways and Waterways*	*Prisons*	*Total*
January	5,492	212	887	247	61	375	—	7,274
February	5,905	215	1,099	528	63	418	1	8,229
March	7,141	212	86	801	72	396	1	8,709
April	5,907	293	48	1,066	145	310	—	7,769
May	6,069	359	154	771	148	402	2	7,905
June	3,673	163	47	189	30	264	3	4,369
July	2,467	112	18	101	24	140	1	2,863
August	1,499	48	1	54	171	86	1	1,860
September	1,177	84	6	12	55	74	—	1,408
October	1,541	226	9	18	124	153	—	2,071
November	2,479	295	58	22	175	260	—	3,289
December	3,186	128	41	29	95	296	—	3,775
	46,536	2,347	2,454	3,838	1,163	3,174	9	59,521
Adgar (*a*)		314	(*a*) data for the separate months not received.					314
Georgia (*a*)		2,815						2,815
	46,536	5,476	2,454	3,838	1,163	3,174	9	62,650
Cases in 1923								
January	4,692	433	1,334	177	215	387	1	7,239
February	4,692	292	1,008	218	99	395	1	6,705
March	5,142	491	1,140	239	34	339	3	7,388
April	4,504	297	1,103	244	43	245	1	6,437
May	4,123	313	867	1	87	242	1	5,634
June	2,452	155	519	—	13	98	4	3,241
July	1,269	52	307	27	21	98	—	1,774
August	944	25	341	7	22	70	—	1,409
September	746	27	62	27	37	50	2	951
October	812	36	134	—	77	91	—	1,150
November	1,024	51	122	—	62	67	1	1,327
December	979	26	289	—	—	81	1	1,376
	31,379	2,198	7,226	940	710	2,163	15	44,631

Asia.

The general trend of smallpox in Asia, as in Europe, has been downward since 1919, and especially so in India. An increased incidence was reported, however, from Siam, Japan and Hong-Kong. The available data are indicated below:

CASES OF SMALLPOX NOTIFIED IN ASIA, 1919-1923.

Countries	1919	1920	1921	1922	1923
Palestine	*	*	2	39	9
Irak	*	*	475	1,826	885
Ceylon	*	126	18	337	175
India (*deaths*)	136,077	101,324	40,446	38,617	16,056
Straits Settlements	480	105	155	330	55
Federated Malay States	*	*	76	16	30
Siam	50	85	404	460	1,467
Hong-Kong	27	34	191	212	1,298
Japan	4,055	3,166	889	673	1,915

Mesopotamia. — There were notified 885 cases, of which 325 proved fatal; the City of Baghdad reported 204 cases. November and December were the months of the highest incidence.

India. — In India, where the disease has been known from time immemorial, the decrease in the number of deaths has been continuous since 1919, and the incidence was unusually low in 1923.

The decrease was marked in all provinces except the Bombay Presidency, which returned more deaths in 1923 than in 1922 (1,328 and 707 deaths, respectively). In 1923 no case was reported in Dehli Province, where the disease has been relatively low since 1919.

Siam. — The disease was more prevalent in 1923 than during the previous years, 1,467 cases and 753 deaths being officially notified as against 460 cases the previous year. The epidemic began in March with 9 cases, and increased steadily to a maximum in August (539 cases and 355 deaths), after which the incidence declined; but it remained at a higher level than during the early part of 1922.

Japan. — 1,915 cases with 381 deaths were notified in 1923 as against 673 cases and 125 deaths in 1922. The majority of cases occurred on the southern island of Kyushu, where a total of 625 cases and 122 deaths was notified. There were reported 249 cases with 58 deaths in Hokkaido (Yezo). On the Japanese mainland most of the cases were reported from Osaka (236 cases and 45 deaths), Hiroshima (371 cases and 100 deaths), Iamaguchi (95 cases and 21 deaths) and Tokio (19 cases with 8 deaths). The island Shikoku returned 133 cases with 19 deaths. The month of maximum incidence was June, that of minimum, September.

* Data not available.

Hong-Kong. — Smallpox has increased steadily since 1914, and a very serious epidemic occurred during 1923, reaching its maximum during the last three months of the year. There were reported altogether 1,298 cases with 1,044 deaths.

Africa.

The reports received by the Health Section of the Secretariat of the League of Nations indicate no unusual prevalence of smallpox in Africa. The countries from which reports have been regularly received are shown below:

CASES OF SMALLPOX NOTIFIED IN AFRICA, 1919-1923

Countries	1919	1920	1921	1922	1923
Egypt	7,928	3,021	93	*	519
Algeria	812	1,172	755	184	141
Zanzibar	4	7	158	167	225
Uganda	*	*	506	104	97
Basutoland	*	*	521	421	675
Union of S. Africa	559	1,036	1,108	713	285

Egypt. — The number of reported cases and deaths was higher than in 1921, but far lower than in 1919 and 1920. There were reported 519 cases with 145 deaths in 1923 as against 3,021 cases and 805 deaths in 1920. The majority of the cases were notified in the provinces of Upper Egypt (423 cases and 124 deaths), especially in Asyut and Ghirka. In the provinces of Lower Egypt 49 cases and 8 deaths occurred; in Cairo, 32 cases and 10 deaths; in Alexandria, 4 cases, and in Suez; cases and 1 death.

Algeria. — The incidence of smallpox has declined markedly since 1920; only 141 cases were notified in 1923 as against 1,172 in 1920.

Uganda. — The disease was much rarer in the last two years than in 1921, the notifications numbering:

	Cases	*Deaths*
1921	506	89
1922	104	12
1923	97	10

Thirteen cases were notified in the *Gold Coast Colony*, 8 cases in *Sierra Leone*, and 45 cases in *Kenya*, from which reports for the previous years have not been received. *Mauritius* was free from smallpox during the three years 1921-23.

The Union of South Africa. — The disease declined materially during the last years and the type is reported to be mild; this is confirmed by the official registration of deaths:

	Cases	*Deaths*
1921	1,108	19
1922	713	23
1923	285	8

The neighbouring Basutoland did not participate in this decrease.

* Data not available.

America.

The prevalence of smallpox was lower than during the preceding years in all the countries from which reports have been received, with the exception of Uruguay. The incidence, however, remained high in the United States. Available data are summarised below:

CASES OF SMALLPOX NOTIFIED IN AMERICA, 1919-1923.

Countries	1919	1920	1921	1922	1923
Ontario (Canada)	3,049	5,639	3,777	977	355
United States	56,332	96,684	102,787	32,800	29,968
Porto Rico	10	2	1	6	0
Habana (Cuba)	55	15	47	34	0
St. Lucia	0	0	0	1	0
British Guiana	*	*	0	0	1
Panama Canal Zone	*	*	215	14	0
Brazil :					
Rio de Janeiro (*deaths*)	305	99	49	117	38
Sao Paulo (*deaths*)	7	416	29	7	*
Uruguay	0 *a*	2 *a*	15 *a*	4	431

The United States. — Although smallpox declined constantly from 1902 to 1916, it increased slightly in 1917 and 1918 and serious epidemics occurred in 1920 and 1921, over 100,000 cases being reported during the latter year.

The Annual Report on Mortality Statistics for 1918 of the United States Bureau of the Census contained an interesting warning about the potential danger of this disease: "It has been many years since smallpox was the cause of high mortality, and data are now presented only to show how few deaths have been due to this disease in recent years..... The danger of smallpox, however, among an unvaccinated population must not be lost sight of and the highest rates in 1918, in Missouri and Utah, should serve as a warning."

Although the number of reported cases fell from 102,787 in 1921 to 32,800 in 1922, little improvement was indicated by the 1923 returns (29,968 cases, with data for Kentucky and Utah missing). The highest incidence was reported from the following States:

States	*Case rate per* 100,000 *pop.*
Montana	110.0
N. Carolina	109.6
Washington	101.5
Oregon	93.7
Minnesota	68.9
N. Dakota	63.8
Vermont	63.3
Indiana	62.8
Michigan	57.8
Wisconsin	47.6
California	47.1

The progress of the smallpox epidemic in each State, during the last five years, is indicated below:

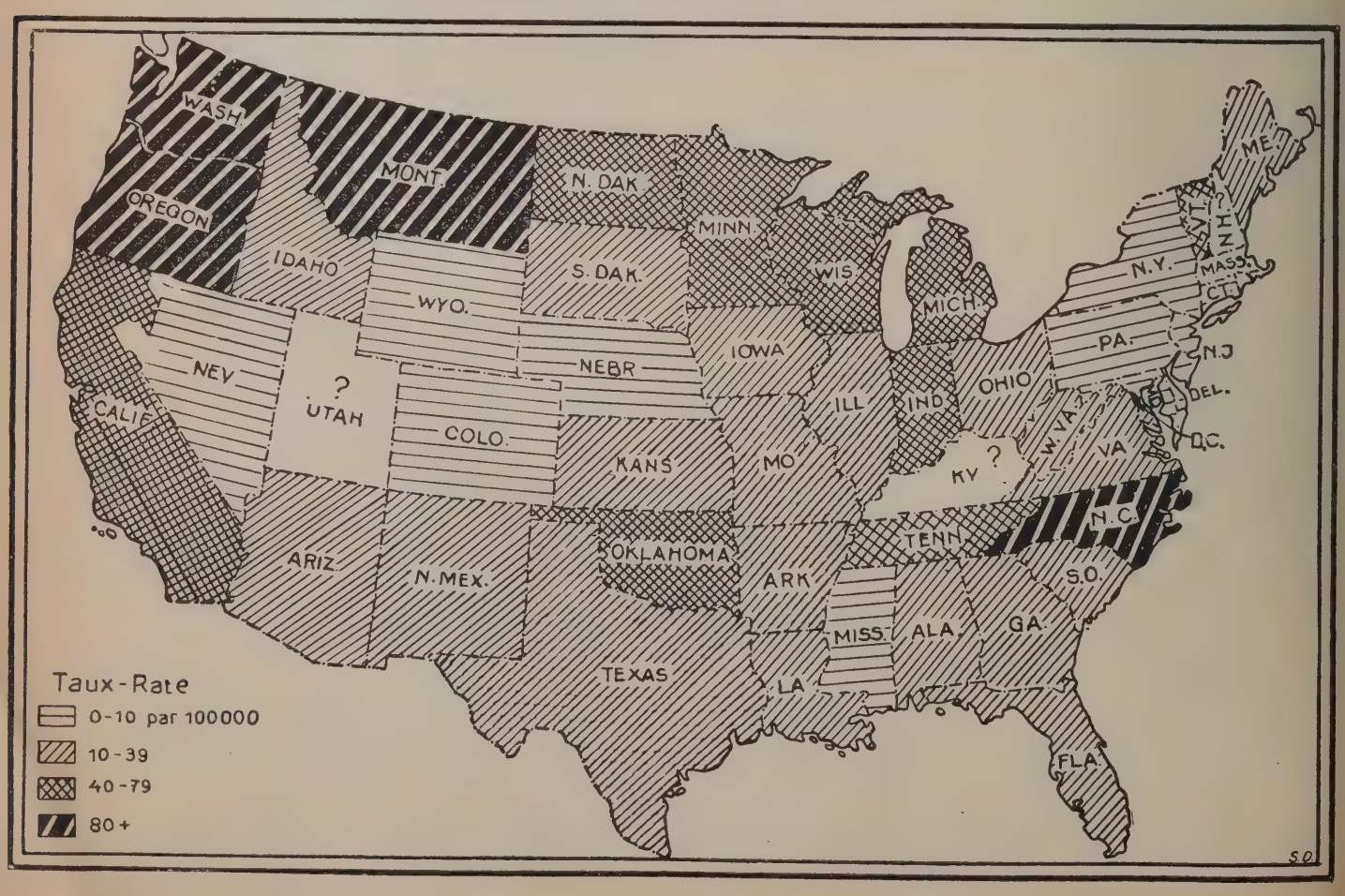
* Data not available. *a* Deaths only.

CASES OF SMALLPOX NOTIFIED IN THE UNITED STATES, 1919-1923.

	1919	1920	1921	1922	1923
New England States :					
Maine	443	256	96	35	117
New Hampshire	0	0	19	0	39
Vermont	5	0	177	14	247
Massachusetts	40	29	37	2	6
Rhode Island	5	1	1	9	0
Connecticut	6	2	8	447	51
Mid. Atlantic States :					
New York	191	307	631	255	391
New Jersey	109	182	255	18	30
Pennsylvania	229	215	212	85	183
South Atlantic States :					
Delaware	0	27	0	0	0
Maryland	229	179	214	17	24
D. of Columbia	173	89	66	66	68
Virginia	1,972	3,468	1,873	511	409
N. Carolina	2,321	2,961	2,513	1,409	3,352
S. Carolina	304	1,118	1,084	342	549
Georgia	1,710	1,328	2,191	756	673
Florida	45	428	1,351	318	228
East South Central States :					
Kentucky	*	*	*	460	*
Tennessee	*	*	2,913	567	1,037
Alabama	935	1,442	2,072	623	352
Mississippi	2,502	3,148	2,161	729	292
West South Central States :					
Arkansas	588	789	481	173	315
Louisiana	1,226	1,564	1,421	645	692
Oklahoma	*	*	1,393	736	1,183
Texas	*	2,113	1,781	1,427	669
East North Central States :					
Ohio	4,107	7,209	7,286	2,422	2,27
West Virginia	2,217	2,592	2,443	453	28
Indiana	3,833	5,775	4,809	1,075	1,91
Illinois	3,334	8,527	8,536	2,116	92
Michigan	2,460	4,845	4,537	1,231	2,31
Wisconsin	3,288	5,668	5,216	1,790	1,33
West North Central States :					
Minnesota	2,448	6,333	9,375	2,215	1,86
Iowa	1,794	4,503	5,204	749	66
Missouri	*	*	*	657	66
N. Dakota	211	533	1,777	657	42
S. Dakota	920	1,534	1,959	859	24
Nebraska	2,844	4,135	3,048	484	9
Kansas	2,437	3,900	4,630	842	45
Mountain States :					
Montana	970	1,066	1,466	636	73
Idaho	*	2,556	857	241	12
Wyoming	462	911	434	206	2
Colorado	1,715	2,898	2,606	1,086	9
New Mexico	*	251	110	53	9
Arizona	*	172	192	468	10
Utah	1,238	*	3,499	*	
Nevada	*	*	235	51	1
Pacific Coast States :					
California	2,002	4,486	5,581	2,129	2,02
Oregon	2,629	2,998	1,596	1,141	81
Washington	4,390	6,146	4,441	1,595	1,60
Total U.S.A.	56,332	96,684	102,787	32,800	29,96

* Data not available.

8. Incidence of Smallpox Notifications in the United States, 1923.



The maximum incidence for the year was from January to May and the minimum in September; a new and rapid rise took place in the last quarter of the year destroying any hope for an immediate improvement; the prevalence became, as a matter of fact, even higher in the first half of 1924 than in 1923.

MONTHLY INCIDENCE OF SMALLPOX CASES NOTIFIED IN THE UNITED STATES IN 1923.

Months	*Cases*	*Months*	*Cases*
January	3,720	July	1,512
February	2,885	August	856
March	3,037	September	715
April	3,432	October	1,418
May	3,361	November	2,845
June	2,243	December	3,944

Australia.

No case of smallpox was notified in Australia and New Zealand either in 1922 or in 1923.

DYSENTERY

Europe.

The official statistics of dysentery prevalence and mortality include, without differentiation, a group of intestinal diseases of varied ethiology. It is certain, however, that amœbic dysentery is uncommon in Europe, and therefore the following statistics undoubtedly refer almost entirely to bacillary dysentery (probably the Shiga-Kruse and Flexner types).

Although more cases of dysentery were reported in 1923 than during the previous year in Germany, Czechoslovakia, Roumania and the Kingdom of the Serbs, Croats and Slovenes, the general trend since the epidemics during the hot summer of 1921 has been definitely downward in Central and Western Europe, and in Russia since 1922. The reported prevalence for the last five years is given below, but the figures must be used with caution for comparative purposes.

CASES OF DYSENTERY NOTIFIED IN EUROPE, 1919-1923.

Countries	1919	1920	1921	1922	1923
Russia in Europe (without Ukraine)	137,169	324,389	164,802	249,757	147,307
Ukraine	—*	—*	55,291	50,138	25,816
Finland	573	573	394	209	193
Esthonia	3,284	3,459	1,198	356	65
Latvia	—*	5,479	1,162	913	114
Lithuania	—*	4,435	1,163	356	184
Poland	7,734	31,020	32,944	14,344	5,314
Germany	—*	—*	31,624	5,036	8,449
Czechoslovakia	7,120	8,211	8,238	1,453	1,539
Austria	6,903	4,212	4,733	1,196	791
Hungary	—*	—*	5,230	2,455	4,321
Kingdom of the Serbs, Croats and Slovenes	—*	11,138	13,279	2,878	3,977
Roumania	271	3,393	2,958	996	1,391
Bulgaria	793	698	569	740	489
Italy	4,973	2,666	2,201	1,197	1,118
Switzerland	36	30	32	5	10
France	800	381	1,852	167	239
Belgium	—*	—*	493	34	93
The Netherlands	16	11	20	14	7
Denmark	5	2	2	3	5
Sweden	53	71	125	63	40
Norway	60	237	168	92	24
Scotland	—*	276	108	42	60
England and Wales	1,657	1,353	1,223	789	493

* No data available.

Russia. — The reported incidence of dysentery was considerably lower in 1923 than in 1922 in the whole of European Russia, including the Ukraine, as well as in the Kirghiz Republic and Turkestan; in Siberia, on the other hand, more cases were reported than in 1922. Apparently, the maximum incidence shown by the figures was in Siberia, the Ural, and Middle Volga regions. The definite downward tendency of the disease in 1923 is confirmed by the fact that the railway authorities reported less than half as many cases as in the previous year.

The following table shows the cases of dysentery notified in Russia, by geographical regions, 1922-1923.

Regions	*Population (in thousands)*	*Cases* 1922	1923	*Rate per 100,000 population*
Northern	4,310	5,349	3,802	88
Western	9,118	14,814	7,033	77
Central	14,741	40,992	18,619	127
Middle Volga	15,482	53,177	40,455	261
Eastern	12,264	52,766	32,324	264
South Central	11,668	28,732	23,548	202
Ukraine	26,070	50,138	25,816	99
Southern	9,362	25,567	12,108	129
Crimea	762	843	462	61
Transcaucasia	5,683	3,057	2,592	46
Kirghiz	5,069	15,512	4,848	96
Turkestan	7,202	4,202	2,666	37
Siberia	8,080	11,507	28,247	350
Railways and Waterways	—	25,677	11,892	—
Prisons	—	1,840	460	—
Total	131,616	334,173	214,862	163

Dysentery was less prevalent in 1923 than in 1922, particularly during the early part of the year, while its incidence became higher than in the former year during the last three months of 1923. The seasonal prevalence of the disease is shown below for the whole territory of Russia.

DYSENTERY IN RUSSIA
SEASONAL VARIATIONS IN 1922 AND 1923,* BY MONTHS.

Months	1922	1923
January	11,812	5,031
February	13,176	3,858
March	15,511	3,768
April	15,741	5,972
May	25,270	7,016
June	28,926	17,980
July	53,778	46,079
August	75,308	58,880
September	31,120	33,113
October	11,701	22,093
November	5,592	8,088
December	3,005	4,984

Poland. — The improvement of the dysentery situation was marked in all parts of Poland, especially in the Eastern Zone, as well as in the *Baltic Republics*.

* Provisional data,

CASES OF DYSENTERY NOTIFIED IN POLAND, PER 10,000 POPULATION, 1922-1923.

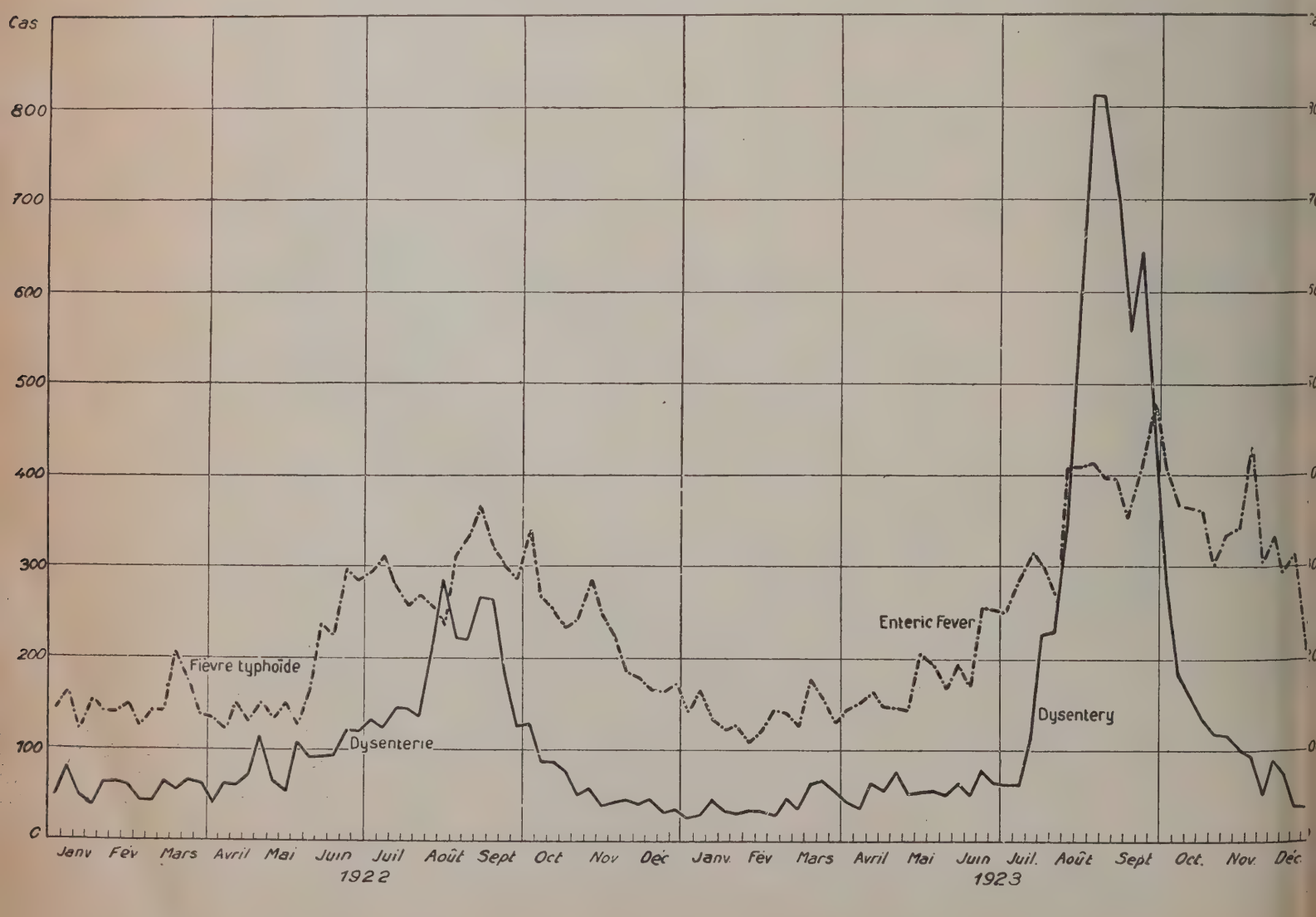
Regions	1922	1923
Eastern Zone	102	17
East Central Zone	33	18
West Central Zone	35	20
Western Zone	48	31

Germany. — There was marked increase of dysentery in nearly all the states of Germany, as shown in the table below. The total number of notifications (8,449) was, nevertheless, far below the incidence of 1921 (31,624 cases).

CASES OF DYSENTERY NOTIFIED IN GERMANY, BY STATES, 1922 AND 1923.

States	1922	1923	*States*	1922	1923
Prussia	3,943	6,768	Brunswick	4	7
Bavaria	316	468	Oldenburg	21	13
Saxony	321	607	Anhalt	10	3
Wurtemberg	78	71	Bremen	17	6
Baden	130	165	Lippe	10	12
Thuringia	22	24	Luebeck	1	2
Hesse	85	188	Mecklemb. Str.	8	1
Hamburg	52	80	Waldeck	—	—
Mecklemb.-Schw.	18	34	Schaumburg-Lippe	—	—

9. Cases of Dysentery and Enteric Fever notified in Germany, 1922-1923.



Czechoslovakia. — More cases of dysentery were reported during 1923 than in 1922 in the eastern provinces of Czechoslovakia, e.g., Ruthenia and Slovakia, while there was a decline in Bohemia.

REPORTED INCIDENCE OF DYSENTERY IN CZECHOSLOVAKIA, BY PROVINCES, 1922-1923.

	1922	1923
Bohemia	467	336
Moravia	104	119
Silesia	77	113
Slovakia	699	738
Sub-Carpathian Ruthenia	168	320

Austria. — There have been less cases reported during 1923 than in the preceding years, the decrease being most evident in Vienna City (328 cases against 528), and in Styria (108 against 238 cases).

Kingdom of the Serbs, Croats and Slovenes. — About thirty per cent more cases of dysentery were notified in 1923 than in 1922; the increase was most evident in Slovenia (62 % more) and in Croatia-Slavonia (35 % more than 1922).

DYSENTERY INCIDENCE IN THE KINGDOM OF THE SERBS, CROATS AND SLOVENES DURING 1922 AND 1923.

Provinces	1922 *Cases*	1922 *Deaths*	1923 *Cases*	1923 *Deaths*
Serbia	855	109	991	169
Croatia-Slavonia	645	99	994	179
Slovenia	547	74	1,438	200
Bosnia-Herzegovina	393	39	432	36
Dalmatia	165	21	118	24
Montenegro	168	16	17	1
Voivodina	105	13	139	18
Total	2,878	371	4,129	637

Roumania. — The increase of dysentery in Roumania was largely due to an outbreak in Bukovina, while the situation was not greatly changed in the other provinces.

CASES AND DEATHS FROM DYSENTERY IN ROUMANIA, 1922-1923.

	1922 *Cases*	1922 *Deaths*	1923 *Cases*	1923 *Deaths*
Old Kingdom	318	78	400	76
Transylvania, etc.	506	60	522	75
Bessarabia	119	15	95	8
Bukovina	50	22	376	76
Total	993	175	1,393	735

Italy. — The dysentery incidence presented a similar geographical distribution as in 1922; nearly half of the cases (550 out of a total of 1,118) were reported in the region of Veneto, 195 in Lombardy, 161 in Piedmont, and 109 in Emilia, the remainder being scattered throughout Central and Southern Italy.

Asia.

Statistics regarding notifications of dysentery are available only for Japan, the Straits Settlements, Palestine and Asiatic Russia; the incidence in the latter region has been shown under the description of European Russia; the data available for the other countries are given below.

	1919	1920	1921	1922	1923
Palestine	*	*	100	128	234
Ceylon	*	*	4,790	5,518	3,446
Straits Settlements	1,209	1,085	1,090	1,085	795

Japan. — A serious increase of dysentery occurred in Japan, the deaths attributed to this disease being more numerous than during any of the preceding ten years.

CASES AND DEATHS FROM DYSENTERY NOTIFIED IN JAPAN, 1914-1923.

	Cases	*Deaths*
1914	26,127	5,718
1915	21,137	4,368
1916	22,452	4,554
1917	14,942	3,160
1918	13,998	2,823
1919	12,915	2,920
1920	12,738	2,961
1921	12,445	2,941
1922	14,899	3,831
1923	20,491	7,259

The greatest number of cases and deaths was returned from the following provinces:

	Cases	*Deaths*
Tokyo	3,605	1,359
Shizuoka	1,644	808
Tokushima	1,407	438
Fukuoka	1,046	427

Africa.

Only four African countries reported on dysentery during 1923. One of these, the *Gold Coast Colony*, gave no previous records, but had 406 cases with 38 deaths in 1923. The figures for *Algeria* were higher in 1923 than during the preceding four years. *Basutoland* reported fewer cases than in 1922. The mortality from this disease is considerably lower in *Mauritius* than during the preceding years; out of 305 cases reported in 1923, 275 were among the soldiers; very few cases were stated to be amœbic, while bacillary dysentery is said to prevail.

CASES OF DYSENTERY NOTIFIED IN VARIOUS COUNTRIES OF AFRICA, 1919-1923.

	1919	1920	1921	1922	1923
Algeria	25	12	41	118	306
Basutoland	*	*	187	89	57
Mauritius (*deaths*)	1,026	499	497	496	321

America.

The United States. — For 1923 reports on notification of dysentery are available from 26 states; no data have been received for previous years. The total number of cases notified was 16,954, nearly all from four states, namely: 9,707, in Missisippi, 2,877 in Virginia, 1,803 in Illinois, and 1,693 in Alabama.

* No data available.

The West Indies, etc. — Dysentery is an important cause of death in many parts of the West Indies; a serious outbreak occurred in Grenada while a considerable decline of the disease was registered in Saint-Vincent. The available data are given below:

		1920	1921	1922	1923
St. Vincent	(*cases*)	*	419	447	161
	(*deaths*)	*	37	29	7
Grenada	(*cases*)	99	109	83	733
St. Lucia	(*cases*)	*	*	20	28
Panama Canal Zone	(*cases*)	*	26	55	66

British Guiana. — 1,111 cases and 89 deaths were recorded in 1923, the maximum incidence occurring in February.

Brazil. — Mortality statistics for Rio de Janeiro and Sao Paulo indicate that dysentery is an important cause of death in both cities; no data have been received from other Brazilian cities.

	1919	1920	1921	1922	1923
Rio de Janeiro (*deaths*)	287	209	217	383	275
Sao Paulo (*deaths*)	483	627	822	852	*

Australia.

Data were received from Queensland, Victoria and Western Australia, where a total of 16 cases were notified as against 12 in 1922, 38 in 1921 and 49 in 1920

* Data not available.

ENTERIC FEVER

Europe.

The term *enteric fever* covers here typhoid fever as well as paratyphoid fevers, the official data rarely differentiating the various types of the group.

Enteric fever appeared to be somewhat more prevalent in Western Europe during 1923 than in the previous year, while a decrease occurred in East Central and Eastern Europe. The decrease was very considerable in Poland and quite marked in the whole of European Russia where the number of cases reported was only one-third that of the previous year. There is a considerable improvement, however also in Western Europe compared with the year immediately after the war.

CASES OF ENTERIC FEVER NOTIFIED IN EUROPE, 1919-1923.

Countries	1919	1920	1921	1922	1923
England and Wales	3,447	3,109	3,835	2,414	3,21
Scotland	634	743	595	439	79
Norway	856	394	601	221	17
Sweden	3,827	1,266	1,123	896	79
Denmark	554	430	422	480	60
Germany	*	*	18,808	10,993	13,16
The Netherlands	4,382	2,223	2,004	1,132	1,39
Belgium	*	*	1,429	1,090	1,40
Switzerland	360	336	451	342	45
France	4,961	7,673	8,116	4,787	6,29
Spain (*deaths*)	5,677	6,998	7,041	5,438	5,13
Italy	23,400	32,487	35,227	25,316	25,31
Bulgaria	4,191	3,080	1,915	2,867	2,79
Roumania	3,766	6,512	6,777	5,954	5,27
Kingdom of the Serbs, Croats and Slovenes	*	3,851	4,617	3,906	3,54
Austria	3,944	2,761	4,288	2,303	2,04
Hungary	*	*	6,880	5,477	4,88
Czechoslovakia	7,796	7,399	9,331	6,612	5,50
Poland	11,421	21,466	30,067	22,056	14,03
Lithuania	*	2,421	1,277	1,140	79
Latvia	*	1,615	1,431	1,011	1,04
Esthonia	583	1,150	1.175	828	67
Finland	2,659	1,499	1,356	1,298	1,65
Russia in Europe (without Ukraine)	228,328	305,715	253,977	220,051	80,77
Ukraine	*	*	122,085	97,654	31,51

* No data available. (See diagram on page 28.)

Russia. — The decrease of enteric fever was general throughout the territory of Russia; the number of cases notified in European Russia was 80,772 as against 220,051 in 1922; in Ukraine 31,514 as against 97,654. The highest incidence, as in 1922, was in the European territory—in Ukraine and the neighbouring regions — but the differences between the north and the south, the east and the west had become less marked. The table below represents the reported incidence by geographical regions but it must be observed that the notification is not of the same quality in all regions.

CASES OF ENTERIC FEVER NOTIFIED IN RUSSIA, IN 1922 AND 1923, BY GEOGRAPHICAL DIVISIONS.

Regions	1922 *Cases*	*Rate per* 100.000	1923 *Cases*	*Rate per* 100,000
Northern	3,701	86	2,245	52
Western	10,475	115	7,226	79
Central	30,340	206	15,845	108
Middle Volga	41,683	269	14,537	94
South Central	43,259	371	17,338	149
Ukraine	97,654	375	31,514	121
Southern	23,793	308	8,080	86
Transcaucasia	4,835	85	1,694	30
Eastern	31,343	256	11,337	92
Crimea	4,193	550	1,142	145
Kirghis	10,274	203	1,801	35
Turkestan	2,660	37	1,059	15
Siberia	17,585	218	14,071	174
Railways, Waterways and Prisons	25,876	—	6,023	—
Total	352,671	268	133,912	102

Poland. — The number of enteric fever cases notified in Poland, which had reached about 30,000 in 1921, the year of greatest incidence, declined to about 22,000 in 1922 and 14,000 in 1923. This represents a lower reported incidence than in Russia but considerably higher than in Germany.

The greatest decrease was reported from the Eastern zone, especially in the districts of Polesia and Volhynia, which were the provinces with the highest incidence. The district of Vilna, to the north, is the only one in the eastern part of Poland showing an increase. The decline became progressively smaller from the eastern frontier districts toward the western frontier, where the incidence in the districts of Pomerania and Posen remained at the same low level as in 1922, and Silesia and Teschen even showed an increase. The following table shows the incidence for each district in 1922 and 1923.

Provinces	*Incidence case rate per* 100,000		*Death rate per* 100,000	
	1922	1923	1922	1923
All Poland	79	53.3	5.88	4.89
Eastern Zone	108.2	45.2	4.88	2.60
Bialystok	83.9	42.2	2.93	3.38
Novogrodek	94.8	43.4	1.54	1.22
Polesia	225.5	24.4	14.33	1.25
Volhynia	139.0	38.7	6.53	1.32
Tarnopol	32.6	32.6	2.61	3.85
Wilna	125.6	152.0	3.68	5.46
East Central Zone	73.9	52.4	6.75	5.44
Warsaw City	120.5	112.0	16.54	15.68
Warsaw District	76.1	60.6	5.78	5.40
Wilna	81.1	45.9	3.64	2.16
Lwow	62.4	41.5	7.08	5.15
Stanislawow	49.8	30.5	5.62	4.08
West Central Zone	88.0	75.5	8.13	7.37
Lodz	98.1	103.0	10.81	9.94
Kielce	88.6	78.4	4.53	6.22
Krakow	75.5	37.5	9.67	5.37
Western Zone	25.9	29.2	1.81	2.59
Pomerania	28.3	30.8	2.44	2.38
Posen	30.2	27.9	2.13	2.58
Teschen and Silesia	16.4	30.1	0.89	2.75

In general the countries in Central and South-Eastern Europe, namely, Czechoslovakia, Austria, Hungary, and, in the Balkans, Roumania, Bulgaria and the Kingdom of the Serbs, Croats and Slovenes showed during 1923 a case incidence of enteric fever ranging from 28 per 100,000 inhabitants in the latter country to 60 in Hungary, with death rates per 100,000 population in the different countries as follows: Austria 2, Czechoslovakia 3, Roumania 3, the Kingdom of the Serbs, Croats and Slovenes 3, Bulgaria 6 and Hungary 8 per 100,000 inhabitants. A slight decrease of the disease occurred in all of this region.

In *Czechoslovakia* the regional distribution was as follows:

	Cases	*Deaths*	*Case incidence*	*Death rate per* 100,000
Bohemia	2,175	196	32.6	2.94
Moravia	1,311	112	49.3	4.21
Silesia	273	13	40.7	1.94
Slovakia	1,690	83	56.4	2.77
Sub-Carpathian Ruthenia	294	16	48.6	2.64

Out of 5,508 cases of enteric fever, 105 were reported as paratyphoid (102 of Type B and 3 of Type A.) Practically all these cases were notified in Bohemia.

Roumania. — There has been a slight decrease in the enteric fever prevalence in Bessarabia and Transylvania during 1923, as compared with 1922, while more cases and deaths were notified in the Old Kingdom and in Bukovina.

ENTERIC FEVER NOTIFICATIONS IN ROUMANIA, BY REGIONS.

	1922		1923	
	Cases	*Deaths*	*Cases*	*Deaths*
Old Kingdom	1,549	234	1,932	251
Transylvania, etc.	1,861	212	1,447	148
Bukovina	224	29	456	66
Bessarabia	1,882	153	1,197	96

In 1923 out of a total of 5,032 cases and 561 deaths notified, 3,299 cases and 350 deaths occurred in the rural districts.

Austria. — A steady decrease of the enteric fever incidence since 1919 is indicated by the death rates (per 100,000):

1919	1920	1921	1922	1923
6.43	4.50	6.95	3.71	3.12

This is reported to be due chiefly to a lower incidence of the disease in the Provinces of Carinthia and Styria.

The *Kingdom of the Serbs, Croats and Slovenes* in 1923 reported 3,484 cases of enteric fever (28 per 100,000) and 507 deaths (3 per 100,000), a slight decrease as compared with 3,906 cases and 504 deaths in 1922. While a diminution was observed in the northern part of the country, in Croatia-Slavonia, Slovenia, Dalmatia, Voivodina and Montenegro, an increase was reported in Bosnia-Herzegovina and in Serbia.

CASES OF AND DEATHS FROM ENTERIC FEVER IN THE KINGDOM OF THE SERBS, CROATS AND SLOVENES, BY PROVINCES, IN 1922 AND 1923.

Provinces	*Cases*		*Deaths*	
	1922	1923	1922	1923
Croatia-Slavonia	1,187	996	171	131
Slovenia	430	321	50	45
Dalmatia	398	292	40	59
Voivodina	1,109	799	158	137
Montenegro	37	14	3	1
Bosnia-Herzegovina	212	477	23	67
Serbia	533	555	59	67
Total	3,906	3,454	504	507

216 cases and 13 deaths from paratyphoid fever were reported, distributed as follows:

	Cases	*Deaths*
Serbia	61	6
Dalmatia	49	2
Slovenia	46	3
Croatia-Slavonia	22	1
Bosnia-Herzegovina	22	1

Bulgaria. — The incidence of enteric fever was not very different in the two last years: 2,799 cases with 326 deaths were reported in 1923 as against 2,857 cases with 301 deaths in 1922. Varna, Vidin, Packmakli, Plevna, Plovdiv, Sofia, Tirnova and Choumen reported the greatest prevalence.

Italy. — The prevalence of enteric fever was the same in 1923 as in 1922, but in both years much lower than in 1921. The highest reported incidence was in Lombardy, Veneto, Emilia and Latio, and the lowest in Southern Italy and the Islands.

CASES OF ENTERIC FEVER NOTIFIED IN ITALY, BY REGIONS.

Regions	1922	1923
Piedmont	2,008	1,749
Liguria	1,258	795
Lombardy	6,655	6,199
Veneto	3,374	4,540
Emilia	2,662	3,020
Tuscany	1,844	1,864
Marches	1,166	984
Umbria	514	542
Rome-Latium	1,726	2,037
Abruzze-Molissa	1,019	835
Campagnia	756	909
Apulia	513	407
Basilicata	100	116
Calabria	693	214
Sicily	866	807
Sardinia	102	132

Spain. — Morbidity data are not available, but the number of deaths certified as due to enteric fever indicate a high prevalence of this disease. The provinces from which the highest number of deaths have been reported are:

	1922	1923
Alicante	199	176
Badajoz	163	166
Burgos	67	103
Barcelona	814	711
Cordoba	152	234
Coruna	176	120
Gerona	88	114
Jaen	128	107
Madrid	221	204
Malaga	189	172
Murcia	224	203
Sevilla	205	264
Valencia	334	290

The provinces of the Mediterranean littoral wit the important industrial centres (cotton mills an ports), the Valley of Guadalquivir and the provinc of Madrid appear to have suffered most from enteri fever.

In *Finland* and in *Denmark*, both of which countrie report typhoid and paratyphoid fever separately a high percentage of enteric fever cases was attribute to paratyphoid. In *Denmark* the percentage o typhoid and paratyphoid fever cases in the las five years was as follows :

CASES OF TYPHOID AND PARATYPHOID FEVERS NOTIFIED IN DENMARK, 1919-1923.

Years	*Enteric Fever*	*Paratyphoid Fever*	%	*Typhoid Fever*	%
1919	554	108	19.5	446	80.5
1920	430	140	32.6	290	67.4
1921	422	127	30.1	295	69.9
1922	480	234	48.8	246	51.2
1923	604	295	48.8	309	51.2

It is not possible to determine whether paratyphoi fevers have actually been spreading in Denmar during recent years or whether they are now bette reported. It is an interesting fact that the para typhoid cases are far more concentrated in the summe than are the typhoid fever cases.

CASES OF TYPHOID AND PARATYPHOID FEVERS NOTIFIED IN DENMARK, BY MONTHS, 1922-1923.

	1922		1923	
	Typhoid	*Paratyphoid*	*Typhoid*	*Paratyphoid*
January	9	0	9	3
February	6	1	17	0
March	6	21	10	1
April	17	10	10	3
May	20	56	16	4
June	12	36	14	7
July	35	34	45	20
August	33	10	54	137
September	28	15	50	87
October	11	36	39	24
November	50	11	27	4
December	19	4	18	5
Total	246	234	309	295

Germany. — The marked decline from 18,808 case notified in 1921 to 10,993 in 1922 was not maintaine in 1923, but a marked increase occurred in the secon half of the year.

CASES OF ENTERIC FEVER NOTIFIED IN GERMANY, BY QUARTERS, 1922 AND 1923.

Quarters	1922	1923
I	1,931	1,778
II	2,283	2,338
III	3,822	4,696
IV	2,957	4,350

Paratyphoid fevers are not reported separately in Prussia but are in some of the other states, which are indicated below:

States	*Typhoid Fever*		*Paratyphoid Fever*	
	1922	1923	1922	1923
Bavaria	349	266	265	561
Saxony	367	625	15	—
Wurtemberg	135	128	9	—
Thuringia	444	430	—	19
Hamburg	141	109	71	75
Meklb.-Schwerin	246	787	27	29

Mortality figures for 1923 which are available for cities with a population of 15,000 and over indicate a lower incidence of the disease in the large cities.

			Death rate per 100,000
46 cities with a population of over		100,000	2
38	» »	50,000 - 100,000	5
61	» »	30,000 - 50,000	6
189	» »	15,000 - 30,000	5

Switzerland. — More cases were notified than in 1922, the incidence being about the same as in 1921. Local outbreaks occurred especially in the cantons of Zurich, Ticino, Vaud and Valais.

United Kingdom. — Enteric fever was more prevalent in the second half of 1923 than in 1922, a year of very low incidence; 3,211 cases were notified in 1923 in England and Wales as against 2,414 the previous year, and 794 cases in Scotland as against 439.

The quarterly figures for *England and Wales* were as follows:

	I	II	III	IV
1922	517	629	668	605
1923	582	601	1,123	906

The increase occurred chiefly in the following counties :

Counties	*Cases of Enteric fever* 1922	1923
London	265	335
Gloucester	70	181
Lancashire	288	339
Essex	58	99
Warwickshire	27	148
Kent	88	120

A similar increase of enteric fever occurred in the second half of 1923 in *France*, *Belgium* and the *Netherlands*, the disease remaining at a much higher level at the end than at the beginning of the year.

Asia.

Japan is the only country in Asia for which reliable statistics on the incidence of enteric fever are available. Little change in the prevalence of typhoid fever has occurred during the last 5 years, but fewer paratyphoid cases were notified in 1923 than during the previous years. Type B of the paratyphoid group prevails as in Europe.

Years	*Enteric fever*		*Typhoid fever*		*Paratyphoid fever*	
	Cases	*Deaths*	*Cases*	*Deaths*	*Cases*	*Deaths*
1919	62,141	11,992	54,706	11,156	7,435	747
1920	61,636	11,175	53,925	10,327	7,726	836
1921	56,424	11,436	49,955	10,624	6,290	858
1922	59,531	11,932	52,381	11,080	7,150	852
1923	58,089	11,997	52,778	11,316	5,311	681

Africa.

Regular reports on the notifications of Enteric Fever have been received from the following countries:

CASES OF ENTERIC FEVER NOTIFIED IN AFRICA, 1919-1923.

Countries	1919	1920	1921	1922	1923
Egypt	2,707	1,799	1,380	*	1,765
Algeria	353	820	1,288	751	712
Mauritius	190	168	288	224	*
Union of South Africa	3,114	5,515	4,511	2,623	4,163

America.

CASES OF ENTERIC FEVER NOTIFIED IN AMERICA, 1919-1923.

Countries	1919	1920	1921	1922	1923
Ontario (Canada)	492	713	725	576	1,665
The United States	36,901	35,726	57,248	35,958	32,500
Porto Rico	189	225	429	301	870
Havana (Cuba)	609	771	418	679	473
Panama Canal Zone	*	*	36	31	24
British Guiana	525	795	489	461	384
Brazil :					
Rio de Janeiro (*deaths*)	125	128	132	152	131
Sao Paulo (*deaths*)	412	663	821	803	*
Uruguay	548	610	1,017	624	656

The United States. — The incidence of enteric fever may be considered normal in 1923; it differed but little from that of 1920 and 1922, but was much lower than in 1921. The disease is, in general, far more prevalent in the South than in the North, as indicated by the table below, which shows the incidence in each State in 1923:

* Data not available.

States	Case incidence per 100,000 pop.	States	Case incidence per 100,000 pop.
New England:		East North Central:	
Maine	26	Ohio	28
New Hampshire	7	West Virginia	86
Vermont	12	Indiana	21
Massachusetts	16	Illinois	27
Rhode Island	7	Michigan	25
Connecticut	21	Wisconsin	12
Middle Atlantic:		West North Central:	
New York	20	Minnesota	17
New Jersey	17	Missouri	21
Pennsylvania	26	North Dakota	19
South Atlantic:		South Dakota	14
Delaware	42	Nebraska	5
Maryland	80	Kansas	39
District of Columbia	26	Mountain:	
Virginia	72	Montana	25
North Carolina	59	Idaho	14
South Carolina	21	Wyoming	28
Georgia	22	Colorado	42
Florida	58	New Mexico	96
East South Central:		Arizona	19
Tennessee	41	Nevada	49
Alabama	81	Pacific:	
Mississippi	94	California	23
West South Central:		Oregon	19
Arkansas	46	Washington	38
Louisiana	44		
Oklahoma	35		
Texas	19		

Australia.

CASES OF ENTERIC FEVER NOTIFIED IN AUSTRALIA AND NEW ZEALAND, 1919-1923.

States	1919	1920	1921	1922	1923
New South Wales	857	1,016	949	718	879
Victoria	263	433	532	294	410
Queensland	724	702	468	400	516
South Australia	125	176	251	143	121
West. Australia	236	387	391	244	261
Tasmania	163	236	308	137	90
Total Australia:	2,368	2,950	2,899	1,936	2,277
New Zealand	477	389	451	539	275

As might be expected, the seasonal distribution is the inverse of that usually seen in countries of the northern hemisphere:

CASES OF ENTERIC FEVER NOTIFIED IN AUSTRALIA, BY QUARTERS, IN 1923.

States	I	II	III	IV	Total
New S. Wales	344	274	88	173	879
Victoria	213	148	24	25	410
Queensland	252	80	49	135	516
S. Australia	35	59	11	16	121
W. Australia	87	105	22	47	261
Tasmania	34	35	15	6	90
Total	965	701	209	402	2,277

MALARIA

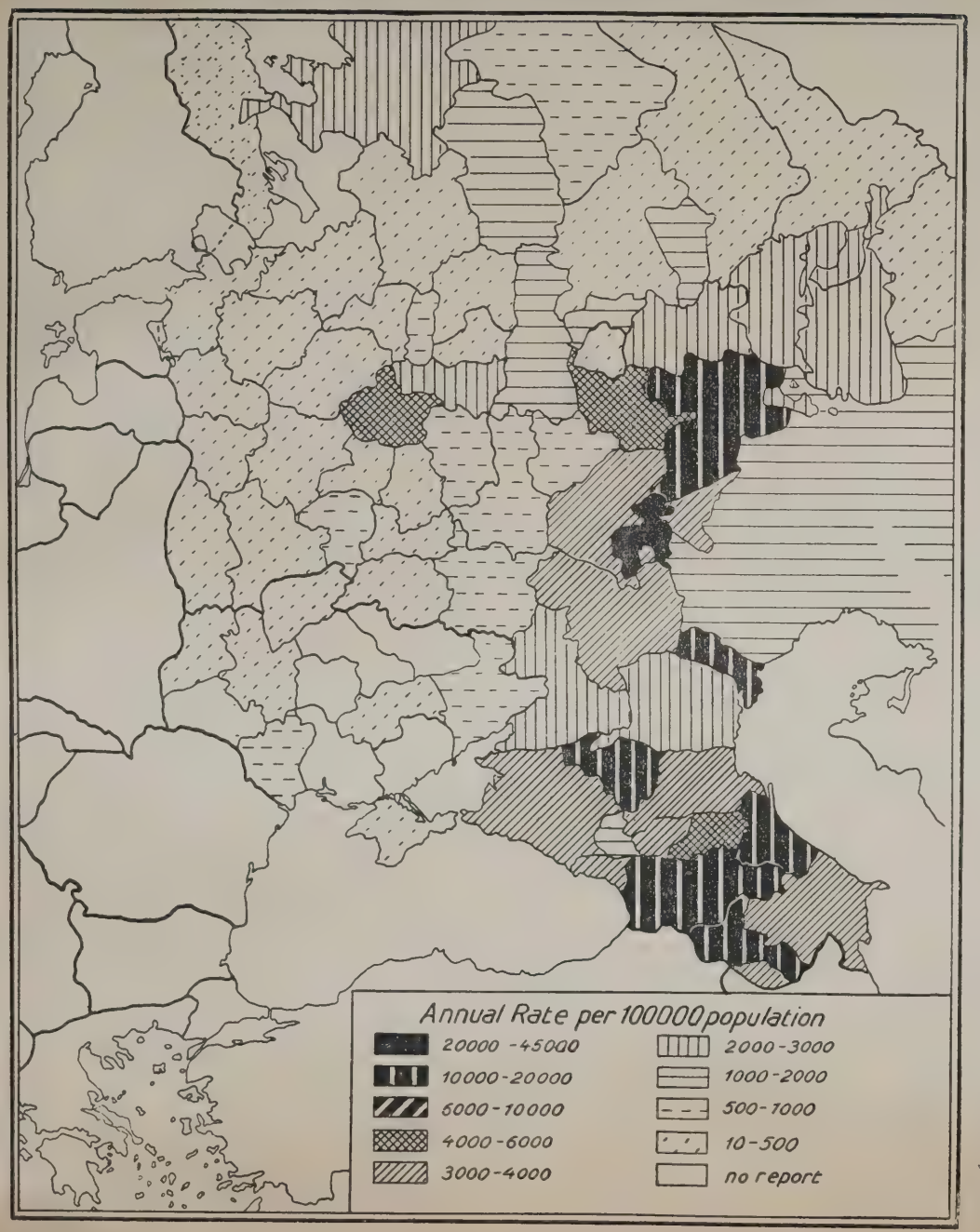
The malaria situation in Europe, in 1923, is dominated by the formidable epidemic in Russia, where over 5½ million cases, more than twice as many as during the previous year, were notified. The disease was greatly reduced, on the contrary, in Poland. Information for 1923 is, as yet, too scarce for the other important malarious area of Europe, the Mediterranean littoral with its river basins, to form an opinion as to its general trend there. Data are available for about half of the countries only, and are frequently incomplete.

CASES OF MALARIA NOTIFIED IN EUROPE, 1919-1923.

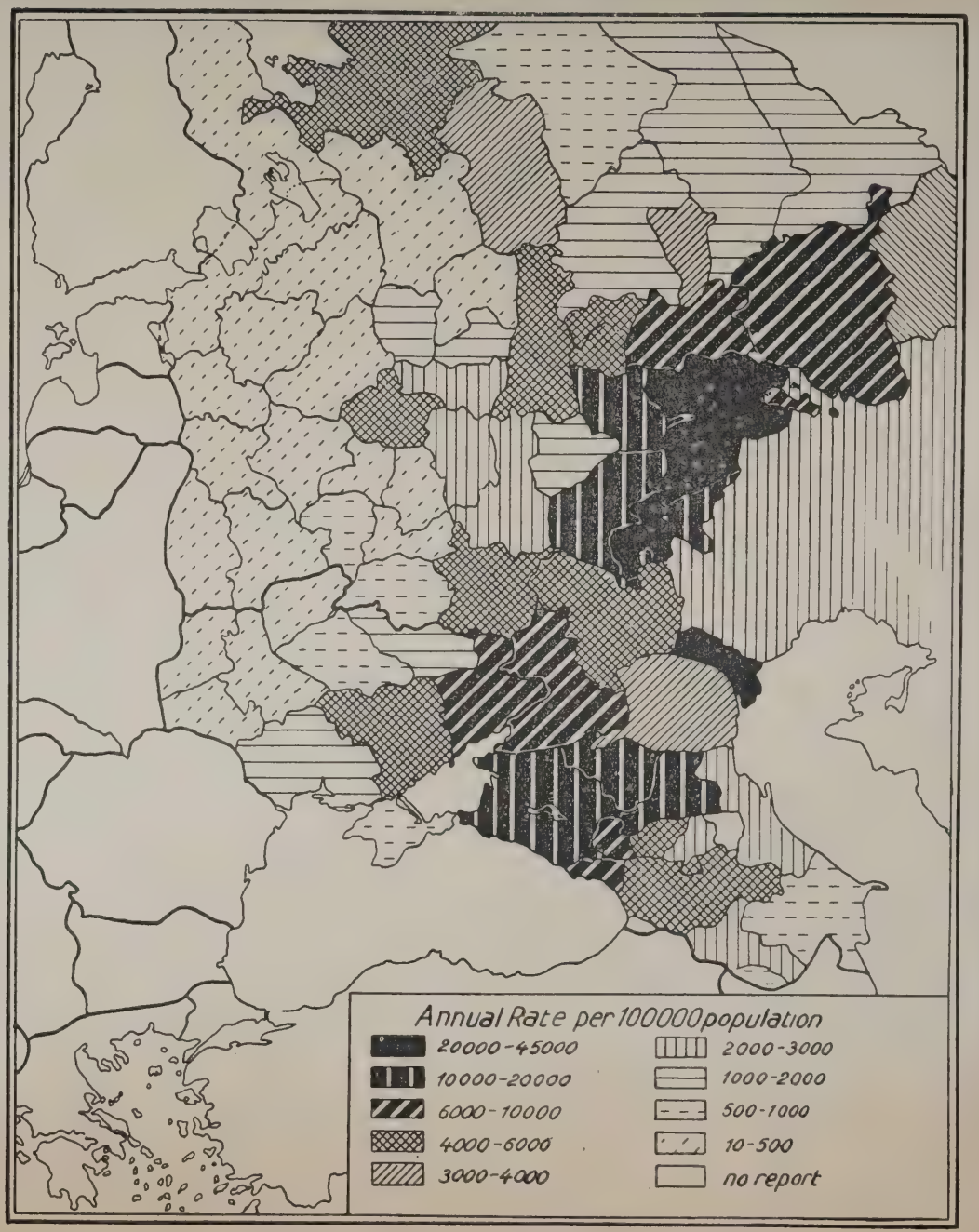
Countries	1919	1920	1921	1922	1923
England and Wales (*a*)	93	32	10	6	3
Scotland	2,856 (*b*)	1,989	308	117	88
Norway	15	11	10	11	12
Denmark	18	15	23	28	16
Switzerland	*	24	5	3	5
Italy	247,084 (*c*)	227,747 (*c*)	267,589	234,656	*
Spain *(deaths)*	1,937	2,044	1,918	1,527	1,262
Kingdom of the Serbs, Croats and Slovenes	*	*	*	16,327	17,926
Austria	5,754	*	123	*	*
Czechoslovakia	1,592	229	130	76	266
Poland	1,513	2,073	52,965	17,611	4,771
Latvia	*	57	192	66	50
Russia in Europe (without Ukraine)	*	*	*	1,647,205	4,484,062
Ukraine	*	*	*	35,712(*c*)	459,842

* Data not available.
(*a*) Cases contracted in England and Wales.
(*b*) From August 1st.
(*c*) Incomplete.

10 *a*. **Malaria incidence notified in Russia, 1922.**



10 *b*. **Malaria incidence notified in Russia, 1923.**



Spain. — A gradual improvement of the malaria situation is indicated by the diminishing number of deaths reported since 1920:-

1920	2,044
1921	1,918
1922	1,527
1923	1,262

The disease remains prevalent, nevertheless, in several regions. The provinces which reported the most deaths were :

Provinces	*Number of Deaths*	
	1922	1923
Alicante	125	94
Badajoz	170	132
Caceres	262	235
Cordoba	105	59
Sevilla	110	105
Ciudadreal	81	77
Cadiz	76	72
Salamanca	69	64

Kingdom of the Serbs, Croats and Slovenes. — Little change has taken place in the malaria incidence; the disease is most prevalent in Dalmatia and in certain parts of Serbia.

The geographical distribution of cases and deaths in 1922 and 1923 was as follows :

	1922		1923	
	Cases	*Deaths*	*Cases*	*Deaths*
Serbia	7,026	142	4,542	125
Croatia-Slavonia	675	7	687	4
Slovenia	—	—	23	—
Bosnia and Herzegovina	1,161	4	955	1
Dalmatia	4,533*	1	12,016	9
Montenegro	929	5	959	7
Voivodina	276	2	744	9
Total :	14,600	161	17,926	155

In *Poland*, where malaria had become prevalent in 1921, but had diminished greatly during the following year, a further reduction of the incidence took place, especially in the Eastern provinces, where it had been most prevalent. The mortality directly due to the disease is low.

Cases of Malaria notified in Poland, by Districts, 1922-1923.

	1922		1923	
	Cases	*Deaths*	*Cases*	*Deaths*
Eastern Zone :				
Bialystok	301	2	79	0
Novogrodek	2,256	1	840	0
Polesia	7,306	0	1,859	0
Volhynia	5,481	1	1,160	1
Tarnopol	17	1	4	0
Vilna	130	1	106	0
	15,491	6	4,048	1
East Central Zone :				
Warsaw City	234	2	151	2
Warsaw District	184	1	133	0
Lublin	1,253	1	293	1
Lwow	12	1	11	0
Stanislawow	1	0	2	0
	1,684	5	590	3
West Central Zone:				
Lodz	69	2	39	0
Kielce	91	0	24	0
Cracow	18	0	6	0
	178	2	69	0
Western Zone :				
Pomerania	2	0	4	0
Posen	58	0	47	0
Teschen	6	0	13	0
	66	0	64	0
Totals	17,419	13	4,771	4

* Incomplete.

Russia. — The malaria situation, which was already very serious in 1922, assumed alarming proportions in 1923, when 5,569,665 cases were notified in the whole territory of the Federation, that is, more than twice as many as in the former year (viz., 2,490,982 cases). The increased prevalence was marked throughout all regions of Russia, with the exception of the Turkestan Republic, where 80,563 were notified in 1923 as against 111,847 in 1922.

Cases of Malaria notified in Russia, 1922-1923.

Regions	1922	1923
Northern	22,992	43,666
Western	2,018	16,896
Central	102,376	224,613
Middle Volga	568,042	1,880,140
Eastern	101,497	425,598
South Central	56,791	282,227
Ukraine	35,712	459,842
Southern	485,995	985,307
Transcaucasia	561,248	153,234
Crimea	1,396	6,295
Kirghiz	91,144	171,032
Turkestan	111,847	80,563
Siberia	50,079	218,102
Railways and Waterways	299,845	602,319
Prisons	—	7,004
Total for Russia	2,490,982	5,566,856

Malaria was already prevalent in Russia before the war, more than three million cases being reported annually, but the tropical (sub-tertian) form was met with only in Caucasus and Turkestan. With the neglect of the irrigation systems in the latter regions and the mass movements of refugees which culminated in the famine year, the disease gained ground rapidly and the malignant forms spread to new regions.

The official statistics represent only the number of sick who have received medical aid and, therefore, especially because of the lack of quinine, not the true incidence, which is placed by Russian experts at about 12,000,000 cases in 1923. The highest incidence was reported from the Southern Volga Region, but also the Middle Volga Region, the Eastern Ukraine and Central Russia were seriously affected. The disease has spread as far north as Archangel, where 41 cases were notified per 1,000 inhabitants in 1923. The epidemic appears to have culminated earlier in the Caucasus and Turkestan, at any rate, fewer cases were notified in 1923 than during the previous year. Great concern is caused by the increased incidence of tropical malaria in European Russia, where it was

formerly unknown. Laboratory examinations indicated that in 1923 about 15 % of the cases were of this type in Northern Caucasia and on the lower Volga, and, in certain governments, even 20 %. As far north as the Government of Moscow, 5 % of the cases were found to be of the sub-tertian type.

Unusual seasonal fluctuations have been observed during the malaria epidemic. While, before the war, the maximum occurred in May, a pronounced increase of cases occurred during the fall of 1922, culminating in September. There was a tendency, the following year, to revert to the normal seasonal distribution, and the maximum incidence occurred in June. This fact has been taken to indicate a probable decrease of the disease in 1924. It has been found that the milder tertian form has its maximum prevalence in spring while the malignant sub-tertian cases prevail in autumn.

CASES OF MALARIA NOTIFIED IN RUSSIA, BY MONTHS, 1923.

Regions and Governments.	*Jan.*	*Feb.*	*March*	*April*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Total*
Northern Region :													
Murman Terr.	—	—	—	6	9	—	2	34	5	—	—	—	56
Karelian Comm.	4	5	1	4	10	20	14	8	4	2	—	—	75
Gov. of Archangel	118	177	881	3,166	2,686	3,055	2,860	1,220	273	205	53	106	14,800
„ Cherepovetz	88	78	80	144	192	296	243	185	184	116	107	136	1,843
„ Vologda	19	10	25	104	157	244	67	36	48	23	10	2	745
„ Severodvinsk	59	161	999	3,072	6,889	4,573	3,284	1,081	817	498	194	186	21,813
„ Kostroma	32	24	125	329	537	712	431	258	131	80	71	30	2,760
Zyrian Region	7	11	40	130	—	735	544	107	—	—	—	—	1,574
Total	327	466	2,151	6,955	10,480	9,629	7,445	2,929	1,462	924	438	460	43,666
Western Region :													
City of Petrograd	6	6	39	61	209	285	—	—	—	—	30	24	660
Gov. of Petrograd	23	21	21	61	—	540	238	137	109	82	—	5	1,237
„ Pskov	23	9	15	29	30	24	21	25	42	19	20	10	267
„ Vitebsk	42	12	74	82	143	130	181	175	172	77	38	20	1,146
„ Gomel	86	132	351	956	2,120	2,645	1,685	1,111	595	323	261	125	10,390
Rep. of White Russia	73	116	299	224	567	390	457	318	191	120	66	12	2,833
Total	253	296	799	1,413	3,069	4,014	2,582	1,766	1,109	621	415	196	16,533
Central Region :													
Gov. of Rybinsk	—	6	—	—	—	—	—	—	—	—	—	—	6
„ Yaroslav	258	242	484	1,345	2,275	1,895	1,255	653	303	342	52	174	9,278
„ Ivanovo-Vosn.	82	104	354	1,206	2,603	2,679	1,416	896	466	357	165	102	10,430
„ Vladimir	376	605	1,052	971	9,827	10,551	6,401	3,708	1,473	1,006	372	303	36,645
„ Tver	79	79	171	347	939	1,261	856	622	453	151	71	8	5,037
„ Smolensk	37	68	104	122	216	281	201	28	112	66	32	31	1,298
City of Moscow	103	111	322	852	2,798	3,534	2,507	2,231	773	971	347	139	14,688
Gov. of Moscow	1,221	1,222	2,941	14,260	15,373	36,232	6,937	7,538	3,961	2,511	2,651	874	95,721
„ Kaluga	108	88	182	209	384	538	431	286	176	114	123	117	2,756
„ Tula	37	56	122	259	1,034	1,170	629	491	222	135	49	66	4,270
„ Riazan	342	331	1,374	1,421	7,291	13,121	10,062	5,766	2,314	1,260	765	437	44,484
Total	2643	2,912	7,106	20,992	42,740	71,262	30,698	22,219	10,253	6,913	4,627	2,251	224,613
Middle Volga Region :													
Gov. of Nijni-Novgorod	1,393	2,315	6,441	15,358	24,314	26,508	13,386	8,606	4,295	2,994	1,685	1,445	108,740
„ Simbirsk	3,838	4,882	13,510	26,815	40,150	36,395	24,024	19,317	13,930	8,642	5,771	4,052	201,326
„ Penza	600	779	1,974	4,864	9,252	7,350	2,914	3,450	1,854	889	730	470	35,126
„ Saratov	10,422	14,154	35,371	47,298	62,097	50,341	40,757	40,032	23,520	11,722	—	4,286	340,000
„ Samara	26,076	33,220	45,703	62,099	67,341	60,467	84,349	96,577	69,936	48,256	38,492	27,851	660,367
Kalmuk Region	331	321	772	1,769	2,609	3,753	2,728	1,629	1,393	782	396	65	16,548
Tatar Republic	3,872	4,846	15,722	29,285	45,601	44,183	35,909	26,849	18,242	10,234	5,465	4,627	244,835
German Community	5,663	8,925	22,208	25,665	40,331	25,883	25,167	31,668	21,188	13,445	7,541	3,297	230,981
Total	52,195	69,442	141,701	213,153	291,694	254,880	229,234	228,128	154,358	96,964	60,080	46,093	1,837,925
South Central Region :													
Gov. of Briansk	71	72	179	340	1,560	2,490	1,319	1,205	600	315	203	195	8,547
„ Voronege	1,459	1,585	4,794	16,262	30,013	30,720	22,322	17,352	10,970	6,440	3,721	2,034	147,672
„ Orel	113	141	23	100	2,397	780	578	526	190	119	64	70	5,101
„ Tambov	1,417	1,291	3,491	6,706	18,823	20,298	20,177	11,906	6,996	4,740	3,400	2,218	101,461
Total	3,058	3,089	8,487	23,408	52,793	54,288	44,396	30,987	18,756	11,614	7,388	4,517	262,781

Cases of Malaria notified in Russia, by Months, 1923.

	Jan.	*Feb.*	*March*	*April*	*May*	*June*	*July*	*Aug.*	*Sept.*	*October*	*Nov.*	*Dec.*	*Total*
Southern Region: Report:	58,476	76,205	160,244	265,921	400,777	394,073	314,252	286,029	185,938	117,036	72,948	53,517	2,385,516
Gov. of Astrakhan	2,544	3,359	5,422	7,429	9,186	8,541	13,306	15,468	16,373	11,117	5,156	1,498	99,399
Gov. of Tzaritzin	1,514	1,233	3,071	6,343	9,878	8,903	10,509	11,706	7,441	6,142	3,947	1,904	72,591
Don Region	1,331	2,865	5,266	14,185	29,222	28,527	19,922	19,123	11,109	7,327	1,113	2,375	142,365
Kalmuk Region	129	292	577	834	1,688	1,392	1,244	1,641	1,436	1,137	684	—	11,054
Gov. of Kubano-Cher.	7,067	7,632	10,922	19,029	31,709	36,081	48,479	74,277	46,857	35,991	26,369	11,687	356,100
Gov. of Stavropol	867	1,104	4,132	3,937	7,371	12,491	19,861	32,347	36,278	13,960	6,759	3,247	142,354
Gov. of Terek	412	910	1,599	2,301	4,036	5,446	11,202	21,655	11,108	3,817	1,629	1,342	65,457
Rep. of Daghestan	5,619	2,028	1,876	268	320	264	2,752	3,469	3,458	—	—	—	20,047
Adigey	557	682	992	1,031	1,312	1,535	2,645	4,509	3,411	1,630	924	—	19,226
Kar. Tcherkassk	129	279	123	227	1,227	741	355	3,190	1,681	1,739	1,213	410	11,314
Mountain Rep.	1,496	615	1,208	1,139	759	997	4,447	2,714	2,648	2,188	701	270	19,182
Total:	21,656	20.999	35,188	56,723	96,708	104,918	134,722	190,099	141,800	85,048	48,495	22,733	959,089
Transcaucasia:													
Abkask	567	693	954	876	900	981	1,457	—	—	1,787	—	—	8,215
Rep. of Azerbeijan	2,635	3,553	2,699	2,778	2,677	2,609	—	—	—	—	—	—	16,951
Georgia	12,378	10,646	13,520	20,612	29,876	7,956	—	—	—	—	—	—	94,988
Armenia	3,932	3,052	3,850	3,694	3,459	3,443	3,981	—	—	—	—	—	25,411
Total:	19,512	17,944	21,023	27,960	36,912	14,989	5,438	—	—	1,787	—	—	145,565
Ukraine	2,101	2,511	5,600	23,385	65,218	88,023	76,032	73,923	58,132	37,945	18,054	8,918	459,842
Crimea	90	111	159	317	425	929	1,129	1,387	891	451	287	119	6,295
Eastern Region:													
Gov. of Perm	52	93	245	1,002	4,177	5,266	5,893	5,692	1,149	675	183	—	24,427
„ Tiumen	99	98	145	556	1,327	1,207	798	667	728	700	65	5	6,395
„ Cheliabinsk	246	116	190	882	4,039	21,285	16,202	13,793	6,542	2,813	762	152	67,022
Votyak Territory	766	687	739	1,570	4,968	5,662	3,539	2,917	1,523	875	589	476	24,311
Bashkir Republic	3,750	5,682	14,530	29,301	43,130	51,987	29,117	30,278	23,348	15,509	6,112	2,798	255,542
Total:	7,104	9,298	21,608	57,013	123,284	174,359	132,710	128,657	92,313	58,968	26,052	12,468	843,834
Kirghiz Republic	5,705	6,816	10,051	16,662	22,068	25,114	24,503	24,423	19,876	15,814	—	—	171,032
Turkestan Republic	3,406	1,759	2,730	2,979	8,338	7,438	6,894	14,599	15,100	12,860	4,460	—	80,563
Siberia	1,770	2,787	10,153	26,996	47,583	43,491	33,063	20,223	15,935	11,479	2,751	1,889	218,120
Railways and Waterways	17,519	18,443	32,473	56,688	83,146	74,196	70,300	90,793	61,111	51,977	31,363	14,310	602,319
Prisons	301	208	286	672	831	860	730	957	621	546	632	360	7,004
Total	17,820	18,651	32,759	57,360	83,977	75,056	71,030	91,750	61,732	52,523	31,995	14,670	609,323
Grand total:	135,449	154,459	293,756	511,614	819,647	839,438	722,712	755,780	532,694	355,515	186,701	105,277	5,413,042

Malaria is, of course, prevalent in most of the tropical and sub-tropical regions of Asia, Africa and America, but reliable data are available for very few countries.

The United States. — The reduction of malaria, which has been in progress for a long time, continued after 1920, when a slight increase had taken place. The number of cases notified in 16 states, reporting regularly since 1919, have been:

1919	1920	1921	1922	1923
134,368	143,003	139,006	120,517	115,217

Malaria is most prevalent in the Southern States, especially in Mississippi, where 53 cases per 1,000 inhabitants were notified in 1923. The number of cases reported during the last five years is given below for certain States where the disease is or has been prevalent.

Cases of Malaria notified in certain States of the United States, 1919-1923.

States	1919	1920	1921	1922	1923
Virginia	4,440	4,575	3,806	3,689	3,006
Georgia	3,345	5,108	2,370	1,888	1,475
Florida	1,895	1,862	994	971	1,050
S. Carolina	737	1,131	280	272	157
Alabama	2,517	756	793	1,445	6,849
Mississippi	112,554	118,376	121,207	105,747	95,222
Arkansas	5,015	8,022	6,360	4,111	5,980
Louisiana	2,411	2,292	2,306	1,597	939
Oklahoma					475
Texas		39,603	49,241	35,727	21,268
Illinois		1,431	1,156	550	91
California	1,056	479	269	215	196

MALTA FEVER

(Undulant Fever, Mediterranean Fever).

Discussion of the prevalence of this disease cannot fail to be unsatisfactory, in the absence of current data on its incidence in Malta, Italy (and its islands Sicily and Sardinia), France (including Corsica), Spain and the Balearic Islands), Gibraltar, Egypt, and the other Eastern Mediterranean countries.

Only two countries, *Algeria* and Tunisia, included this disease among those for which data were regularly given. In the former country, where 11 cases were reported in 1922, only nine cases were reported in 1923, 2 in March, 4 in April, 2 in July and 1 in December. This small number of cases would indicate either that the disease is becoming rare in these regions or that it is incompletely notified. *Tunisia* reported 69 cases during the year. The highest number in any month, 15, was recorded in September; 11 in July and 8 each in April and November. The same observations apparently hold true for Tunisia as for Algeria.

In *Malta*, according to data for part of 1923 taken from the Public Health Reports of the United States Public Health Service, and for 1921 and 1922 from the official Report on the Health of the Maltese Islands, the disease appears to be assuming a definite upward tendency. In 1921, 710 cases were reported; 1,102 in 1922, and 741 in the last six months of 1923.

An active propaganda campaign, in addition to the ordinary administrative measures, was waged during 1922. Circulars in Maltese, Italian and English pointing out the danger of consuming goats' milk unboiled were freely distributed. Similar notices were posted, and read in the parish meetings throughout the two islands. A routine examination of as many milch goats as possible is made twice yearly, and animals found to be infected are destroyed.

Malta fever is apparently carefully controlled in *Gibraltar*. Goats within the territory are registered and all are examined serologically each year. The Spanish farmers supplying goats' milk within the territory are listed, and all milk in commerce is required to be boiled. Samples of the milk are frequently examined. Only six cases of Malta or Mediterranean fever were reported to the Health Authorities during 1922, all said to be sporadic.

DENGUE FEVER

Dengue fever, which has been epidemic on several occasions in the southern part of the United States, especially in 1903 and 1915, reached an unprecedented prevalence in the autumn of 1922.

The epidemic appeared first in Houston (Texas) in July and spread rapidly along the railroad lines to all parts of East and Central Texas and to the neighbouring States. The number of cases has been estimated at between 500,000 and 600,000 in Texas, the chief centres being in Galveston (30,000), Houston (30,000) and Dallas (20,000). The maximum of the epidemic was reached in October, after which it fell rapidly and became rare from February 1923. A very slight recrudescence occurred in the following autumn. The disease is stated to be very incompletely reported, largely because of its wild character; such data as are available are given below:

CASES OF DENGUE FEVER NOTIFIED IN THE UNITED STATES, 1919-1923.

States	1919	1920	1921	1922	1923
Georgia	8	170	30	5,148	44
Florida	26	1	358	4,990	48
Alabama	—	45	—	493	196
Mississippi	—	—	—	4,158	309
Arkansas	—	—	—	502	12
Louisiana	2	—	8	7,561	1,349
Texas	—	—	18	41,397	999
Illinois	—	—	3	—	—
N. Dakota	—	1	—	—	—
Kansas	—	—	—	1	—

CASES OF DENGUE FEVER NOTIFIED IN THE UNITED STATES, 1919-1923 (*continued*).

States	1919	1920	1921	1921	1923
Colorado	1	—	—	—	—
New Mexico	—	—	—	1	—
California	—	—	1	3	—
No. of States reporting	4	4	5	11	7

SEASONAL DISTRIBUTION OF DENGUE CASES NOTIFIED IN THE UNITED STATES, 1922-1923.

Months	1922	1923
January	0	1,381
February	0	162
March	0	132
April	2	84
May	4	48
June	72	41
July	956	50
August	1,460	111
September	6,387	205
October	32,239	511
November	9,449	171
December	1,595	61

No death was caused directly by the dengue; only as complication of other diseases were a few deaths recorded. The epidemic is said to have coincided with an unprecedented prevalence of the mosquito *Ædes ægypti*.

INFLUENZA

The official morbidity statistics represent rarely the true incidence of influenza. The usual mild character of the uncomplicated case and the difficulty of exact diagnosis in inter-epidemic periods, as well as the sudden outbursts and the numerous complications which during the epidemics overburden the practitioners, make difficult the gathering of complete case records. Very few countries therefore, have made the notification of influenza compulsory.

Mortality statistics furnish no better index for the actual prevalence of the disease, not only because the case fatality varies greatly from one epidemic to another but still more because no definite international agreement has been reached regarding the classification of deaths from the complications of influenza. It has been impossible, up to the present, to give any exact figures for the loss of life caused in the various countries by the influenza epidemics.

A study of weekly or monthly mortality statistics reveals that the influenza waves influence profoundly the general mortality curve and especially the mortality from pneumonias, bronchitis, pulmonary tuberculosis and diseases of the heart. It is quite possible, therefore, to follow the movement of this disease in the various localities, even though its incidence cannot be definitely ascertained.

Europe.

Influenza appears to have been much less severe in Europe in 1923 than it was the previous winter, when severe epidemics occurred in several countries. The deaths reported as due to influenza are given below for various large cities.

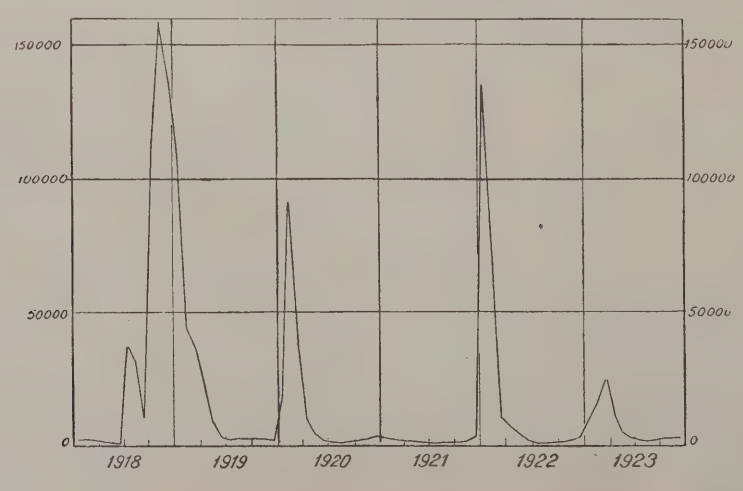
DEATHS FROM INFLUENZA IN VARIOUS CITIES BY FOUR-WEEKLY PERIODS, 1923.

Cities	*Total* 1922	*Total* 1923	*Dec.* 31 *Jan.* 27	*Jan.* 28 *Feb.* 24	*Feb.* 25 *Mar.* 24	*Mar.* 25 *April* 21	*April* 22 *May* 19	*May* 20 *June* 16	*June* 17 *July* 14	*July* 15 *Aug.* 11	*Aug.* 12 *Sept.* 8	*Sept.* 9 *Oct.* 6	*Oct.* 7 *Nov.* 3	*Nov.* 4 *Dec.* 1	*Dec.* 2 *Dec.* 29
105 Great Towns of England and Wales	10,435	4,146	27[illegible]	261	369	661	725	581	266	89	74	101	139	216	391
46 German cities	6,856	3,474	1,10[illegible]	674	461	215	193	126	104	69	56	83	85	123	179
7 Towns of Northern Ireland	330	145	[illegible]	4	12	26	24	11	8	5	2	3	9	8	26
Antwerp	96	41	[illegible]	10	7	2	2	0	1	2	0	0	3	5	2
Berlin	963	738	201	114	110	32	48	31	24	20	8	27	30	38	55
Christiania	94	48	[illegible]	19	14	3	1	0	0	0	0	0	0	2	1
Copenhagen	193	71	[illegible]	10	17	17	6	2	2	1	4	2	3	2	1
Glasgow	796	63	[illegible]	8	3	4	5	6	5	0	2	3	4	5	10
London	2,582	752	4[illegible]	53	105	152	92	43	30	15	13	29	29	46	96
Madrid*	241	231	2[illegible]	35	40	23	23	11	8	4	10	11	13	27	—
Milan*	200	42	14	14	6	5	0	0	0	0	0	0	3	3	—
Paris*	517	169	21	32	31	10	8	2	1	1	0	1	6	56	—
Stockholm	168	7	1	1	2	0	0	1	0	0	0	0	0	1	1
Vienna	280	90	5	14	25	19	3	2	10	0	2	0	4	0	6
Boston	66	98	19	33	23	8	4	1	0	0	0	0	1	1	8
Chicago	281	430	25	143	118	41	30	10	3	4	4	4	7	14	27
New Orleans	—	161	16	50	43	17	8	4	1	2	1	1	3	8	7
New York	864	1,159	77	397	393	101	45	24	6	6	9	15	15	36	35
San Francisco	185	47	2	25	0	2	2	1	1	0	1	0	3	3	7
Rio de Janeiro *	888	1,079	57	105	171	157	119	83	89	68	57	61	50	62	—
Montevideo*	13	54	[illegible]	0	0	0	0	0	39	5	7	2	0	1	—
Bombay	518	239	21	18	27	42	37	36	15	5	8	8	12	5	5
Calcutta	658	368	4[illegible]	45	35	29	15	21	19	26	33	37	17	25	20
Madras	28	22	[illegible]	1	0	1	2	1	1	0	1	1	1	6	7
Rangoon	—	132	7	7	11	5	2	3	18	16	16	14	12	16	5
Hong-Kong	238	77	5	4	5	2	4	14	8	8	8	9	6	1	3

* Monthly data.

Denmark. — Less cases were reported during 1923 than in 1922, the numbers being 79,779 and 237,316, respectively. After the pandemic of 1918, when 496,755 cases were notified, the influenza incidence has diminished until 1922, when the disease became widespread in January. The 1923 outbreak was less important and the maximum was reached only in March. The figures for 1918 are probably less complete than those for the subsequent years.

11. Monthly Incidence of Influenza notified cases in Denmark, 1918-1923.



CASES OF INFLUENZA NOTIFIED IN DENMARK, BY MONTHS, 1918-1923.

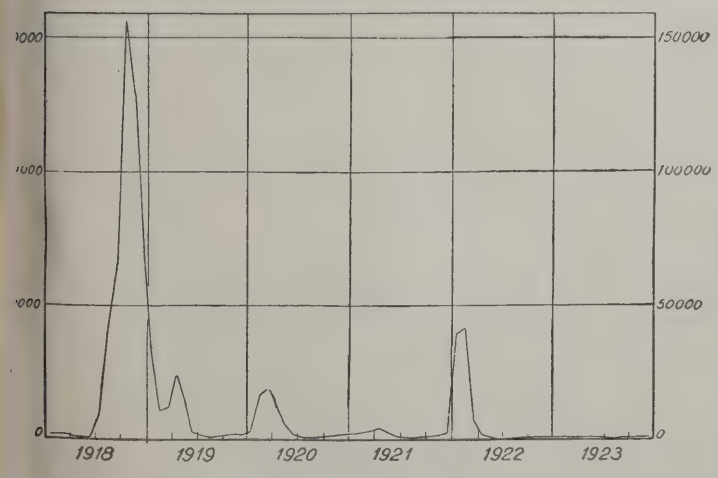
Months	1918	1919	1920	1921	1922	1923
anuary	2,082	109,362	18,680	2,628	135,017	9,200
ebruary	2,018	44,540	92,867	2,434	70,214	15,533
[arch	1,864	27,053	38,258	2,117	10,947	25,810
pril	1,464	23,529	10,083	1,503	6,151	11,415
[ay	962	7,441	4,164	1,266	3,852	4,093
une	645	2,307	1,941	958	1,502	1,972
uly	37,848	2,093	1,050	837	861	1,207
ugust	31,289	2,226	1,015	1,013	912	1,156
eptember	10,151	2,104	1,349	1,127	1,061	1,624
ctober	115,646	2,478	1,431	1,300	1,391	2,467
ovember	138,595	2,122	2,197	1,735	2,191	2,677
ecember	136,191	1,960	2,701	3,235	3,217	2,625
Total	496,755	236,215	157,736	20,153	237,316	79,779

Sweden. — A similar trend of the disease was ndicated by the Swedish statistics, but the 1923 utbreak seems to have been less important than in enmark. Warning is given against making any mparison between the number of cases actually corded in the various countries.

CASES OF INFLUENZA NOTIFIED IN SWEDEN, BY MONTHS, 1918-1923.

lonths	1918	1919	1920	1921	1922	1923
an.	1,508	33,217	3,140	2,110	39,250	730
eb.	1,321	10,955	16,560	2,151	41,637	1,054
[arch	1,228	11,826	19,395	3,218	7,224	834
pril	960	24,799	13,289	4,640	1,932	658
[ay	669	13,608	5,861	2,160	652	536
une	484	2,849	1,344	869	77	243
uly	9,423	1,008	591	527	56	146
ug.	39,714	773	409	317	56	86
ept.	66,744	910	537	416	148	200
ct.	156,334	1,463	774	642	282	230
ov.	129,281	1,873	1,473	1,188	574	194
ec.	69,926	1,655	1,821	2,331	783	308
otal	477,592	104,936	65,194	20,569	92,671	5,219

12. Monthly Incidence of Influenza (notified cases) in Sweden, 1918-1923.



Norway. — The 1923 incidence was far below that f the previous year, also here, but probably somewhat reater than in Sweden.

CASES OF INFLUENZA NOTIFIED IN NORWEGIAN CITIES, BY MONTHS, 1921-1923.

Months	1921	1922	1923
January	826	37,405	5,382
February	796	9,134	9,058
March	697	1,206	5,144
April	478	537	945
May	339	314	371
June	238	222	235
July	129	111	163
August	114	139	137
September	153	239	229
October	182	331	337
November	282	643	643
December	1,145	1,423	1,140
Total	5,379	51,704	23,784

Scotland. — Less mortality from influenza has been registered in 1923 than during any year after 1918. The maximum incidence occurred during the first quarter of the year.

DEATHS REGISTERED AS DUE TO INFLUENZA IN SCOTLAND, BY MONTHS, 1918-1923.

Months	1918	1919	1920	1921	1922	1923
January	47	781	83	143	1,926	
February	27	3,039	72	281	1,125	206
March	47	2,530	196	355	241	
April	66	441	395	173	112	
May	77	143	293	80	64	149
June	52	63	66	36	27	
July	768	39	32	20	22	
August	232	22	20	27	16	48
September	240	21	22	20	22	
October	3,714	35	33	41	33	
November	4,272	49	53	58	72	126
December	1,569	52	74	96	46	
Total	11,111	7,215	1,339	1,330	3,706	529

The 529 deaths attributed to influenza during 1923 were distributed as follows :

Sole cause influenza	127
Complicated with :	
Phthisis	3
Bronchitis	60
Pneumonia	166
Other respiratory diseases	24
Diseases and accidents of pregnancy and parturition	7
Other causes	142
	529

England and Wales. — The following number of deaths have been attributed to influenza during the last ten years :

Years	*Deaths*	*Years*	*Deaths*
1914	5,953	1919	44,801
1915	10,471	1920	10,665
1916	8,782	1921	8,995
1917	7,283	1922	21,498
1918	112,310	1923	8,461

The 1923 outbreak came unusually late and did not reach its maximum until the middle of May, or later than in any other European country. The mortality was far lower than during the previous year and about equal to that of 1921, when the maximum was reached at the beginning of March.

Germany. — The deaths registered as due to influenza in German cities of more than 100,000 inhabitants numbered 3,572 in 1921, 6,856 in 1922 and 3,474 in 1923. The maximum incidence occurred in the latter year, in January, that is, earlier than in Scandinavia and in the United Kingdom.

Switzerland. — Relatively few cases of influenza were notified in 1923; the maximum was reached in February and March.

Cases of Influenza notified in Switzerland, by months, 1922-1923.

Months	1922	1923	*Months*	1922	1923
January	22,701	249	July	7	32
February	28,999	803	August	19	34
March	7,680	555	September	16	26
April	442	166	October	39	36
May	122	65	November	134	51
June	24	85	December	112	48

Spain. — The mortality from influenza was about the same as in 1922. The following number of deaths were reported :

Years	*Deaths*	*Years*	*Deaths*
1918	147,114	1921	5,924
1919	21,094	1922	8,068
1920	17,841	1923	8,401

Russia. — More cases of influenza were notified in 1923 than during the previous years, but it is doubtful whether this corresponds to an actual increase of the disease.

Cases of Influenza notified in Russia, by Geographical Regions, 1922-1923.

Regions	1922	1923
Northern	14,704	50,486
Western	23,007	76,720
Central	79,239	170,894
Middle Volga	86,530	173,105
Eastern	38,808	94,878
South Central	55,178	106,231
	297,466	672,314

Cases of Influenza notified in Russia, by Geographical Regions, 1922-1923 (*contd.*).

Regions	1922	1923
Brought forward	297,466	672,31[illegible]
Ukraine	*	*
Southern	21,946	73,02[illegible]
Transcaucasia	9,282	3,68[illegible]
Crimea	2,283	10,22[illegible]
Kirghiz	*	19,49[illegible]
Turkestan	1,523	9,18[illegible]
Siberia	832	113,54[illegible]
Railways and Waterways	202,337	178,76[illegible]
Prisons	*	2,78[illegible]
Total	535,669	1,083,016

Asia.

Precise information regarding the incidence of influenza in Asia is very scarce, but a decrease from the previous year is indicated by the deaths registered as due to this disease in Hong-Kong, the Straits Settlements, Calcutta and Bombay.

	Hong-Kong	*Straits Settlements*	*Calcutta*	*Bombay*
Deaths, 1922	422	234	658	518
Deaths, 1923	77	165	368	239

Africa.

The few data available hardly permit definite conclusions regarding the general prevalence of influenza on this continent.

In *Algeria*, 411 cases were notified as against 944 in 1922, indicating a decline similar to that observed in Europe. A lower incidence was indicated also by the data for *Basutoland* in South Africa and for the Island of *Mauritius*, where 544 deaths from influenza were recorded in 1923 as against 631 in 1922 and 1,563 in 1921.

An increased incidence is reported, on the other hand, from parts of Central Africa; 1,933 cases and 291 deaths were thus reported in the territory of *Tanganyika* as against 1,176 cases and 37 deaths in 1922. 3,043 cases were notified in *Nyasaland*, in 1923, the outbreak culminating in March.

America.

The United States. — Influenza appears to have been slightly more prevalent in 1923 than in 1922. The increase occurred largely in the Southern States, while a decrease took place in many Northern States. Fewer cases were reported in California, where the disease was epidemic in 1922. The number of cases notified in the various States is given below and give some indication of the movement of the disease from year to year; the figures do not indicate the true incidence of the disease and the States cannot be directly compared.

* Data not available.

CASES OF INFLUENZA NOTIFIED IN THE UNITED STATES, 1919-1923.

States	1919	1920	1921	1922	1923
New England States :					
Maine	3,379	14,332	234	2,533	3,481
New Hampshire	*	3,014	*	141	28
Vermont	7,882	—	—	—	27
Massachusetts	40,416	36,312	735	7,453	2,467
Rhode Island	5,690	7,250	113	995	34
Connecticut	10,664	23,931	281	5,941	2,545
Middle Atlantic States :					
New York	68,873	127,772	3,812	35,581	27,118
New Jersey	22,544	29,110	985	7,430	3,396
Pennsylvania	*	*	*	*	*
South Atlantic States :					
Delaware	—	413	128	183	340
Maryland	27,618	31,924	2,848	5,557	18,317
District of Columbia	4,275	4,115	66	102	410
Virginia	69,151	104,497	10,973	51,406	87,736
North Carolina	14,126	76,308	*	*	*
South Carolina	11,578	6,728	*	19,967	5,265
Georgia	7,147	36,193	620	6,612	7,140
Florida	2,010	10,349	649	1,635	1,015
East South Central States :					
Kentucky	*	*	*	5,781	*
Tennessee	*	*	*	*	562
Alabama	9,420	17,749	*	2,780	12,541
Mississippi	64,738	53,289	4,920	44,503	82,313
West South Central States :					
Arkansas	7,016	34,088	1,190	4,628	15,825
Louisiana	40,565	19,854	402	13,922	6,311
Oklahoma	*	*	97	991	6,421
Texas	*	22,414	676	3,690	14,302
East North Central States :					
Ohio	89,264	72,041	—	3,860	6,462
West Virginia	5,079	39,665	741	7,640	10,208
Indiana	22,396	27,091	499	1,409	2,054
Illinois	27,654	168,955	2,574	15,895	7,397
Michigan	*	*	*	1,339	1,309
Wisconsin	7,020	37,950	1,037	5,853	10,680
West North Central States :					
Minnesota	12,945	4,436	*	1,254	202
Iowa	*	13,093	*	*	12
Missouri	*	*	*	3,723	10,829
N. Dakota	750	11,645	*	*	373
S. Dakota	8,991	7,479	*	198	230
Nebraska	23,683	22,887	108	1,194	1,301
Kansas	41,799 —	70,243	259	5,119	5,159
Mountain States :					
Montana	5,860	7,308	71	1,869	361
Idaho	*	9,357	*	1,031	45
Wyoming	3,119	3,930	89	1,701	206
Colorado	4,603	*	*	1,824	238
New Mexico	*	12,673	42	3,321	489
Arizona	*	5,132	*	*	1
Utah	29,536	1,736	189	*	*
Nevada	*	*	32	1,274	250
Pacific Coast States :					
California	81,574	58,976	2,565	45,433	7,867
Oregon	10,780	8,738	*	1,983	345
Washington	8,711	23,108	*	*	51
Hawaii	12,292	17,843	786	788	2,455

* No data available.

South America. — Influenza appears to have been more prevalent, in 1923, in the few localities from where data are available than during the previous year, without, however, attaining any unusually high incidence. 1,079 deaths were attributed to this disease in the Federal District of *Rio de Janeiro* as against 911 in 1922, 777 in 1921 and 421 in 1920. In *Uruguay* 116 deaths from influenza were registered in 1923 as against 8 during the previous year. In *Peru* the cities of Lima and Callao reported, respectively, 125 and 43 deaths from this cause.

Australasia.

Australia. — 1,133 cases were reported in Southern Australia as against 36 in 1922; the other provinces have reported no cases, and the disease does not appear to have been prevalent in 1923.

New Zealand. — A higher prevalence in 1923 than during the previous year is indicated; 1,155 cases and 222 deaths were notified as against 216 cases and 66 deaths in 1922. The incidence increased abruptly in July, reached its maximum in August and declined sharply in September.

ENCEPHALITIS LETHARGICA

Encephalitis lethargica appears to have been more prevalent than during the previous year in most countries, without, however, reaching its high level of 1921. Cases of this disease are not very numerous in comparison with most other epidemic diseases, but they are reported from widely separated regions of the world. The disease is not, as yet, notifiable in a majority of countries, but the data given below may give some indication of its general trend and prevalence, when keeping in mind that the omission of a country signifies that data are not available and not that the disease does not occur there.

CASES OF ENCEPHALITIS LETHARGICA NOTIFIED IN VARIOUS COUNTRIES, 1919-1923.

Countries	1919	1920	1921	1922	1923
Scotland	2	—	3	20	110
England and Wales	541	890	1,470	454	1,025
Norway	11	38	55	7	10
Sweden	*	352	1,512	192	536
Finland	*	239	1,095	46	83
Denmark	26	223	138	42	91
Belgium	*	*	243	26	27
Switzerland	*	984	156	62	203
Italy	*	*	278	477	277
Czechoslovakia	*	*	*	150	366
Poland	*	*	85	121	329
Lithuania	*	*	*	*	72
Latvia	*	*	6	4	—
Esthonia	*	*	9	—	12
European Russia	*	*	*	*	703
Ukraine	*	*	*	*	196
Transcaucasia	*	*	*	*	16
Turkestan	*	*	*	*	33
Algeria	*	20	11	13	7
Union of South Africa	*	25	33	6	13
The United States (31 Stat.)	*	*	*	*	2,387
Rio de Janeiro (*deaths*)	*	17	7	7	4
Uruguay	*	*	*	12	2
Australia	*	2	3	18	23
New Zealand	90	42	23	36	41

* No data available.

England and Wales. — Twice as many cases were reported as in 1922, the greatest prevalence being in March. The case fatality was about 50 per cent (531 deaths in 1923), that is, nearly the same as in earlier years.

Scandinavia. — The disease was prevalent, especially in Sweden, but less so than in 1921. The maximum was reached in February.

Czechoslovakia. — 366 cases with 119 deaths (33 % case fatality) were notified during 1923, as against 150 cases with 59 deaths in 1922 (case fatality 39 %). The cases occurred in the following provinces :

184 cases and 72 deaths in Bohemia,
152 „ „ 41 „ „ Moravia and Silesia,
30 „ „ 6 „ „ Slovakia.

The greatest prevalence was observed in February (100 cases).

Switzerland. — The disease was more prevalent than during the two previous years, but less than in 1920. The maximum occurred in January. The highest incidence was reported from the cantons of Zurich (48 cases) and Geneva (33 cases).

Italy. — Fewer cases were reported than in 1922; the cases occurred mostly during the first quarter of the year, March being the month of maximum prevalence.

Russia. — The highest number of cases were reported in July, which is unusual, but not without precedent, outbreaks having been observed in summertime also in Poland in 1921 and in England in 1920.

The United States. — Out of the 2,387 cases notified in 31 States, 1,106 occurred in the State of New York, 183 in Massachusetts, 137 in Pennsylvania, 119 in Illinois and 142 in California. The disease is stated to have been more prevalent and the type more severe in 1923 than the previous year, in New York City.

ACUTE POLIOMYELITIS

An increased incidence of poliomyelitis in Europe, especially in England, Sweden and Switzerland and in the United States, is indicated by the data received from the few countries where the disease is notifiable. Nowhere, however, has there been any outbreak equal to the epidemics of 1911 in Scandinavia and of 1916 in the United States.

CASES OF ACUTE POLIOMYELITIS NOTIFIED IN VARIOUS COUNTRIES, 1919-1923.

Countries	1919	1920	1921	1922	1923
England and Wales	553	293	488	355	587
Norway	35	24	3	5	19
Sweden	820	181	141	112	313
Finland	12	19	15	30	47
Denmark	389	60	70	59	75
France	194	134	211	165	175
Switzerland	31	104	72	65	256

CASES OF ACUTE POLIOMYELITIS NOTIFIED IN VARIOUS COUNTRIES, 1919-1923 (*contd.*).

Countries	1919	1920	1921	1922	1923
Austria	1	26	13	10	14
Algeria	1	1	13	2	5
Union of South Africa	10	35	33	18	5
Ontario (Canada)	49	37	81	205	19
The United States (29 States)	1,790	2,225	5,880	2,034	2,912
Hawaii	*	*	3	1	10
Panama Canal Zone	*	*	3	3	—
Cuba	—	—	3	1	1
Uruguay	*	*	*	15	5
Australia	134	71	140	114	137
New Zealand	11	76	267	98	16

* Data not available.

The majority of the cases have been reported, excepting in Australia, where the seasons are inverted, in the second and third quarter of the year.

SEASONAL DISTRIBUTION OF POLIOMYELITIS CASES NOTIFIED IN VARIOUS COUNTRIES, 1923.

Countries	*1st quarter*	*2nd quarter*	*3rd quarter*	*4th quarter*
England and Wales	77	67	261	182
Norway	2	4	9	4
Sweden	12	10	119	172
Finland	5	5	15	22
Denmark	8	7	27	33
France	37	44	51	43
Switzerland	18	17	88	133
The United States (27 States)	136	152	1,217	953
Australia	40	55	23	19

The regional distribution of poliomyelitis in the United States is indicated below.

CASES OF POLIOMYELITIS NOTIFIED IN THE UNITED STATES, BY GEOGRAPHICAL REGIONS, 1919-1923.

Regions	1919	1920	1921	1922	1923
New England	100	805	425	428	363
Middle Atlantic	296	409	1,563	816	1,319
South Atlantic	339	180	454	186	213
East South Central	111	66	65	75	81
West South Central	43	12	47	72	62
East North Central	795	545	1,828	333	446
West North Central	146	147	1,102	149	488
Rocky Mountains	18	41	86	77	33
Pacific Coast	45	88	696	86	280
Total	1,893	2,293	6,266	2,222	3,285
No. of States reporting	35	35	42	40	54

CEREBRO-SPINAL MENINGITIS

Cerebro-spinal *(meningococcal)* meningitis occurs throughout the entire world, but, like poliomyelitis and encephalitis lethargica, nowhere in very large numbers. The 1923 statistics indicate no definite general tendency of this disease; some countries report more, others fewer, cases than during the preceding years, but the changes are usually not large. This disease is notifiable in most countries, but it should be kept in mind that adequate means for bacteriological verification are not everywhere available.

CASES OF CEREBRO-SPINAL MENINGITIS NOTIFIED IN EUROPEAN COUNTRIES, 1919-1923.

Countries	1919	1920	1921	1922	1923
England and Wales	848	583	411	344	301
Scotland	191	86	121	116	114
Norway	14	16	15	6	12
Sweden	116	102	120	79	86
Denmark	227	144	92	84	100
Germany	*	*	696	1,622	1,155
The Netherlands	122	133	120	132	111
Belgium	63	38	35	50	56
Switzerland	30	39	32	30	69
France	490	417	398	379	381
Italy	266	110	86	66	368
Bulgaria	16	17	36	6	12
Austria	46	34	21	38	38
Hungary	*	*	35	49	29
Czechoslovakia	67	75	80	190	142
Poland	330	596	477	533	597
Lithuania	*	*	*	20	13
Latvia	*	88	31	22	19
Esthonia	2	9	12	14	22

Cerebro-spinal meningitis has declined steadily in *England and Wales* since 1915, when 2,566 cases were notified. The maximum prevalence occurs usually during the first quarter of the year, but in 1923 the highest number of cases were notified in June and October.

* No data available.

While the incidence of this disease was about normal in the *Scandinavian* countries, it was lower in *Germany* than in 1922, when it had been unusually prevalent. An increase occurred in *Italy*, where 367 cases were notified as against 66 the previous year; the greatest prevalence was in the regions of Latium and Veneto (51 cases each), but a few cases were notified in each province.

CASES OF CEREBRO-SPINAL MENINGITIS NOTIFIED IN NON-EUROPEAN COUNTRIES, 1919-1923.

Countries	1919	1920	1921	1922	1923
Asia :					
Cyprus	10	9	27	7	4
Palestine	*	*	15	23	5
Iraq	*	*	26	12	8
Straits Settlements	*	29	86	85	14
Hong-Kong	267	158	125	53	100
Japan	2,456	944	771	933	704
Africa :					
Egypt	85	43	43	*	44
Algeria	39	25	31	61	61
Tanganyika	*	*	17	9	101
Uganda	*	*	*	677	203
Union of South Africa	21	128	113	58	515
America :					
Ontario (Canada)	131	77	79	71	64
The United States (22 States)	2,034	2,012	1,816	1,451	1,283
Habana (Cuba)	2	39	19	1	6
Panama Canal Zone	*	*	5	15	12
Rio de Janeiro (*deaths*)	4	110	95	119	46
Hawaii	8	5	21	17	13
Australasia :					
Australia	65	75	80	69	61
New Zealand	96	79	56	42	36

* Data not available.

Reliable data are available for very few countries in Asia. The incidence of the disease has diminished in *Japan* since 1919, when 2,456 cases were notified; 704 cases were reported in 1923, the case fatality being 54 per cent, or about the same as in Europe

Serious outbreaks have occurred in Africa during recent years, particularly in the prairie lands north and south of the tropical forest belt; outbreaks were reported, in 1923, in *Uganda* and the *Tanganyika* territory. The cases reported in the *Union of South Africa* increased from 58, in 1922, to 515, in 1923, chiefly because of a serious outbreak in Witwatersrand near Pretoria in Transvaal.

The number of cases reported in the *United States* has decreased steadily for several years, important declines being reported particularly from the States of New York, Illinois and California. Cases are reported from nearly all States of the Union.

SCARLET FEVER

CASES OF SCARLET FEVER NOTIFIED IN VARIOUS COUNTRIES, 1919-1923.

Countries	1919	1920	1921	1922	1923
Europe :					
England and Wales	82,398	119,490	137,073	108,242	85,608
Scotland	12,787	17,449	17,025	14,589	16,754
Norway	1,077	889	483	913	1,108
Sweden	9,310	9,750	9,264	10,718	10,916
Finland	7,395	1,970	1,359	990	1,148
Denmark	8,330	12,285	11,093	5,109	3,893
Germany	*	*	48,281	32,448	27,234
The Netherlands	16,721	6,208	4,045	3,301	3,580
Belgium	2,259	1,985	1,588	1,496	2,008
Switzerland	3,865	3,939	3,733	2,272	2,136
France	11,056	16,839	13,667	7,435	5,254
Spain (*deaths*)	675	1,235	856	628	471
Italy	6,690	10,209	11,079	11,965	13,682
Kingdom of the Serbs, Croats and Slovenes	*	4,940	15,221	18,088	16,521
Bulgaria	3,113	4,398	5,645	7,196	15,585
Roumania	2,179	15,562	43,670	29,027	23,706
Hungary	*	*	21,664	13,243	6,386
Austria	2,932	4,635	4,210	2,658	3,154
Czechoslovakia	3,685	4,188	9,425	10,784	10,522
Poland	4,690	16,664	28,164	14,717	15,746
Lithuania	*	*	*	437	230
Latvia	*	2,572	1,532	1,598	1,555
Esthonia	2,100	2,549	1,433	583	676
European Russia (without Ukraine)	37,026	56,693	74,009	55,827	80,931
Ukraine	*	*	33,263	18,538	19,474
Asia :					
Transcaucasia	*	*	*	204	330
Kirghiz Republic	*	*	*	1,330	281
Turkestan	*	*	*	111	95
Siberia	*	*	*	4,023	7,128
Japan	1,325	1,368	1,589	1,654	1,571
Africa :					
Algeria	102	103	87	111	163
Gold Coast Colony	206	135	166	*	107
Union of South Africa	2,783	1,756	920	640	2,042
America :					
Ontario (Canada)	3,749	5,130	4,564	3,950	5,011
The United States (36 States)	103,477	154,758	181,927	148,617	163,954
Habana (Cuba)	25	109	74	130	44
Hawaii	21	17	21	32	21
Australasia :					
Australia	4,954	5,180	6,104	5,779	6,469
New Zealand	1,521	1,248	1,845	1,449	1,208

* Data not available.

Scarlet fever was prevalent throughout Europe in 1920 and 1921 and declined during the two following years; the disease began, however, to increase again in 1923 in several countries of Eastern and Southern Europe and especially in Bulgaria.

England and Wales. — The number of reported ases has diminished steadily since 1921, but the ncidence is still high. The reported case fatality as been (per cent. of fatal cases) : 1.5 in 1919, 1.2 in 1920, 0.9 in 1921, 1.3 in 1922, and 1.2 in 1923. The seasonal fluctuations are indicated below for some of the more important countries :

CASES OF SCARLET FEVER NOTIFIED IN VARIOUS COUNTIES OF ENGLAND AND WALES DURING 1922-1923, BY QUARTERS.

Counties	1922				1923				*Whole Year* 1922	*Whole Year* 1923
	I.	II.	III.	IV.	I.	II.	III.	IV.		
ondon	5,490	4,167	3,815	3,753	2,774	2,264	2,117	2,927	17,225	10,082
hester	771	756	643	854	680	648	525	634	3,024	2,487
urham	791	715	605	910	969	963	910	1,515	3,021	4,357
ssex	1,308	878	823	887	630	446	470	717	3,846	2,263
loucester	531	545	557	868	927	580	355	507	2,501	2,369
ent	909	598	545	580	554	434	315	384	2,682	1,367
ancashire	5,045	4,060	3,341	5,002	4,225	3,408	2,508	2,907	17,448	13,048
iddlesex	1,775	1,202	1,011	1,145	793	515	357	713	5,133	2,378
outhampton	1,021	508	422	696	544	407	356	489	2,647	1,796
tafford	852	848	862	1,694	1,405	969	721	1,021	4,256	4,116
urrey	920	736	531	685	602	423	266	328	2,872	1,619
Warwick	1,256	1,080	1,041	1,379	1,220	972	783	903	4,756	3,878
orkshire West Riding	2,336	2,243	2,322	2,980	2,868	1,875	1,572	2,457	9,881	8,772
lamorgan	1,135	1,059	1,109	1,325	1,191	785	530	707	4,628	3,213

A slight increase over the previous year's incidence as recorded in *Sweden*, *Norway*, *Finland* and *Esthonia*, hile the disease has decreased steadily since 1920 *Denmark*. A small increase occurred also in the *etherlands* and *Belgium*, but the incidence remained mparatively low. The decrease has been continuous nce 1921 also in *Germany* and in *Switzerland*, and, nce 1920, in *France* and *Spain*. A small increase of e scarlet fever incidence occurred in *Italy*, especially the regions of Veneto and Toscana.

The distribution of the reported scarlet fever cidence in the *Kingdom of the Serbs, Croats and ovenes* is indicated below. The high proportion of aths to cases indicates probably an incomplete tification, as in certain other countries of South-astern and Eastern Europe.

The incidence of scarlet fever remained high, though minished in comparison with the two previous ars.

ASES OF SCARLET FEVER NOTIFIED IN THE KINGDOM OF THE SERBS, CROATS AND SLOVENES, BY PROVINCES, 1922 AND 1923.

Provinces	1922 *Cases*	1922 *Deaths*	1923 *Cases*	1923 *Deaths*
rbia	6,955	1,577	4,021	1,090
oatia-Slavonia	3,744	767	3,824	733
ovenia	761	102	1,299	231
snia and Herzegovina	1,910	541	3,516	917
almatia	434	72	454	95
ontenegro	212	57	79	10
ivodina	4,069	876	2,858	601
Total	18,085	3,992	16,051	3,677

The outbreak of scarlet fever, which occurred in *Bulgaria* towards the end of 1923, especially in the Western Provinces, is indicated below :

CASES OF SCARLET FEVER NOTIFIED IN BULGARIA, BY MONTHS, 1921-1923.

Months	1921	1922	1923
January	514	590	750
February	521	533	661
March	498	290	593
April	241	204	521
May	281	248	700
June	391	251	648
July	240	337	821
August	301	507	1,096
September	575	810	1,954
October	775	1,197	2,403
November	969	1,267	3,115
December	755	1,117	2,323
Total	5,645	7,196	15,153*

The number of deaths from this disease was 2,935 in 1923 as against 1,211 the previous year.

CASES OF SCARLET FEVER NOTIFIED IN ROUMANIA, BY REGIONS, 1922-1923.

Regions	1922 *Cases*	1922 *Deaths*	1923 *Cases*	1923 *Deaths*
Old Kingdom	12,523	2,127	11,721	1,769
Transylvania, etc.	8,145	1,394	6,141	843
Bessarabia	3,404	396	1,148	58
Bukovina	924	158	2,772	368
Total	24,996	4,075	21,792	3,038

The slightly higher incidence in *Austria* was due largely to the City of Vienna.

* Provisional data.

CASES OF SCARLET FEVER NOTIFIED IN AUSTRIA, BY PROVINCES, 1922-1923.

Provinces	1922 Cases	1922 Deaths	1923 Cases	1923 Deaths
Vienna City	1,240	28	1,742	39
Lower Austria	593	10	510	4
Upper Austria	156	2	124	1
Salzburg	50	—	55	1
Styria	382	22	453	28
Carynthia	74	—	47	—
Tyrol	127	—	160	3
Vorarlberg	17	—	22	—
Burgenland	19	1	41	1
Total	2,658	63	3,154	77

The incidence of the disease increased, in 1923, in the Western Provinces of *Czechoslovakia*, but diminished in the Eastern Provinces.

CASES OF SCARLET FEVER NOTIFIED IN CZECHOSLOVAKIA, BY PROVINCES, 1922 AND 1923.

Provinces	1922 Cases	1922 Deaths	1923 Cases	1923 Deaths
Bohemia	2,064	123	3,390	206
Moravia Silesia	2,313	159	4,018	220
Slovakia	3,835	565	2,548	239
Sub-Carpathian Ruthenia	2,572	340	566	90
Total	10,784	1,187	10,522	755

The marked decrease of scarlet fever in *Hungary* from 1921 to 1922 continued in 1923, 6,386 cases being reported in the latter year as against 13,243 and 21,664 the two previous years.

The returns for *Poland* were higher than in 1922, excepting in the Eastern Marches, where fewer cases were reported.

CASES OF SCARLET FEVER NOTIFIED IN POLAND, BY PROVINCES, 1922-1923 (*Provisional data*).

Provinces	1922		1923	
Eastern Zone :	*Cases*	*Deaths*	*Cases*	*Deaths*
Bialystok	852	66	229	18
Nowogrodek	561	13	361	14
Polesia	531	31	693	88
Volhynia	1,181	48	249	7
Tarnopol	990	157	1,486	264
Vilna	431*	25*	487	19
	4,546	340	3,505	410
East Central Zone :				
Warsaw City	1,181	211	2,327	208
Warsaw District	610	60	939	84
Lublin	694	64	706	62
Lwow	2,090	392	2,035	285
Stanislawow	2,017	488	1,267	270
	6,592	1,215	7,274	909
West Central Zone :				
Lodz	545	83	899	99
Kielce	498	43	716	48
Cracow	1,255	162	1,548	110
	2,298	288	3,163	257
Western Zone :				
Pomerania	223	24	442	35
Posen	822	73	682	61
Teschen	235	14	519	24
	1,280	111	1,643	120
	14,716	1,954	15,585	1,696

* 1st quarter missing.

A higher incidence of scarlet fever in 1923 is indicated for the larger part of the *Russian* Federation, especially in Central and Northern Russia.

CASES OF SCARLET FEVER NOTIFIED IN RUSSIA, BY REGIONS, 1922-1923.

Regions	1922	1923
Northern	3,231	4,205
Western	5,549	6,238
Central	16,409	20,197
Middle Volga	10,912	17,148
Eastern Region	4,203	4,640
South Central	6,318	17,137
Ukraine	18,538	19,474
Southern	2,948	2,882
Transcaucasia	204	330
Crimea	963	626
Kirghiz	1,330	281
Turkestan	111	95
Siberia	4,123	7,128
Railways and Waterways	5,294	7,854
Prisons	—	4
Total for Russia	80,033	108,239

Scarlet fever is not very prevalent in *Japan*, but the type is more severe than in Western Europe.

INCIDENCE OF SCARLET FEVER IN JAPAN, 1919-1923.

Years	*Cases*	*Deaths*	*Case fatality per cent*
1919	1,325	109	8.2
1920	1,368	90	6.6
1921	1,589	82	5.2
1922	1,654	96	5.8
1923	1,571	102	6.5

The disease does not appear to be very prevalent in Africa judging from the scant information which is available. In the *Union of South Africa*, however, 2,042 cases were notified in 1923 as against 640 the previous year.

The following number of cases were notified in the *United States* :

1919	104,503	cases in	38	States
1920	157,547	,, ,,	42	,,
1921	189,856	,, ,,	47	,,
1922	158,975	,, ,,	48	,,
1923	173,349	,, ,,	47	,,

The highest incidence in 1923 (per 100,000 population) was returned from Wisconsin (460), Minnesota (383), Michigan (323), Massachusetts (306), S. Dakota (292), Ohio (272), Maryland (254), Delaware (235), District of Columbia (228), North Dakota (216) and California (206).

The lowest incidence was apparently in the South-Central States and in some South Atlantic States (N. Carolina, S. Carolina, Georgia, Florida).

CASES OF SCARLET FEVER NOTIFIED IN THE UNITED STATES, 1919-1923.

States	1919	1920	1921	1922	1923
New England :					
Maine	879	1,039	1,346	1,458	1,141
New Hampshire	*	597	609	370	334
Vermont	438	*	1,447	1,391	653
Massachusetts	8,019	10,260	8,331	7,868	12,319
Rhode Island	792	876	873	448	818
Connecticut	2,663	4,028	4,001	3,132	3,385

* Data not available.

CASE OF SCARLET FEVER NOTIFIED IN THE UNITED STATES, 1919-1923 (*contd.*).

States	1919	1920	1921	1922	1923
Middle Atlantic :					
New York	12,075	15,188	25,663	21,521	20,536
New Jersey	4,240	4,782	9,228	9,066	5,780
Pennsylvania	11,336	21,027	24,065	16,597	15,057
South Atlantic :					
Delaware	*	317	638	1,683	541
Maryland	5,507	2,636	2,559	2,874	3,818
Dist. of Columbia	665	782	853	478	998
Virginia	1,872	2,188	3,096	3,197	2,698
North Carolina	1,512	1,663	2,585	3,153	2,418
South Carolina	175	143	318	241	186
Georgia	708	759	754	644	394
Florida	146	163	172	105	94
East South Central :					
Kentucky	*	*	*	875	*
Tennessee	*	*	1,275	1,079	631
Alabama	647	690	746	545	773
Mississippi	1,256	1,610	994	482	428
West South Central:					
Arkansas	628	704	566	270	270
Louisiana	257	372	389	336	264
Oklahoma	*	*	539	292	651
Texas	*	831	1,040	744	807
East North Central:					
Ohio	8,017	16,211	14,312	13,146	16,621
West Virginia	2,223	2,073	2,632	1,851	2,127
Indiana	4,105	7,435	7,698	3,501	3,466
Illinois	7,334	18,084	19,023	12,268	9,474
Michigan	5,398	10,266	10,917	9,687	12,849
Wisconsin	3,776	5,822	7,787	5,708	12,622
West North Central:					
Minnesota	2,657	3,329	6,588	7,696	9,559
Iowa	1,661	2,832	4,335	2,874	3,707
Missouri	*	*	*	2,991	4,307
North Dakota	800	1,232	1,040	1,021	1,450
South Dakota	1,063	2,062	1,489	1,577	1,918
Nebraska	757	2,058	2,470	2,272	1,598
Kansas	2,791	5,091	6,535	4,657	3,514

CASES OF SCARLET FEVER NOTIFIED IN THE UNITED STATES, 1919-1923 (*contd.*).

States	1919	1920	1921	1922	1923
Mountain Region:					
Montana	1,901	891	620	676	705
Idaho	*	461	498	327	578
Wyoming	232	263	301	125	270
Colorado	998	1,010	1,531	1,710	1,953
New Mexico	*	402	355	427	394
Arizona	*	181	196	136	440
Utah	588	*	1,257	*	*
Nevada	*	*	75	43	62
Pacific Coast :					
California	2,870	4,117	5,557	5,602	7,840
Oregon	1,034	844	747	567	808
Washington	2,483	2,228	1,806	1,264	2,098
Total	104,503	157,547	189,856	158,975	173,349

Very large fluctuations have not occurred in the incidence of the disease in *Australia*; the seasonal incidence of the reported cases is shown below :

CASES OF SCARLET FEVER NOTIFIED IN AUSTRALIA, EACH QUARTER OF 1923.

States	I	II	III	IV	Total
New South Wales	517	735	773	610	2,635
Victoria	393	634	340	205	1,572
Queensland	59	87	60	105	311
South Australia	368	477	283	168	1,296
Western Australia	18	14	16	10	58
Tasmania	180	172	206	39	597
Total	1,535	2,119	1,678	1,137	6,469

The following number of cases and deaths has been reported in New Zealand during the last three years :

Years	*Cases*	*Deaths*	*Case fatality per cent.*
1921	1,845	245	13
1922	1,449	105	7
1923	1,208	95	8

* No data available.

DIPHTHERIA

CASES OF DIPHTHERIA NOTIFIED IN VARIOUS COUNTRIES, 1919-1923.

Countries	1919	1920	1921	1922	1923
Europe :					
England and Wales	53,918	69,481	66,506	52,153	40,009
Scotland	9,078	10,766	10,112	7,372	7,106
Norway	8,365	3,582	1,952	850	826
Sweden	40,514	26,448	15,133	6,610	4,808
Finland	8,851	6,330	3,941	1,941	1,787
Denmark	9,904	13,567	13,945	7,929	5,680
Germany	*	*	63,018	37,949	31,942
Netherlands	10,900	8,091	7,575	4,740	4,134
Belgium	8,080	6,409	3,914	2,279	2,353
Switzerland	7,690	8,456	7,702	4,415	3,290
France	10,009	14,598	16,981	12,624	11,033
Spain (*deaths*)	2,639	2,723	3,037	2,878	2,289
Italy	11,103	12,619	12,081	11,347	10,922

* No information available.

CASES OF DIPHTHERIA NOTIFIED IN VARIOUS COUNTRIES, 1919-1923 (*contd.*).

Countries	1919	1920	1921	1922	1923
Kingdom of the Serbs, Croats and Slovenes	*	1,912	2,667	1,935	1,963
Bulgaria	1,630	1,347	1,054	795	1,094
Roumania	712	2,238	3,050	1,519	1,445
Hungary	*	*	3,781	2,656	2,635
Austria	5,578	5,288	3,921	2,807	2,806
Czechoslovakia	4,608	4,872	4,380	3,223	3,159
Poland	1,815	3,178	4,130	4,228	3,694
Lithuania	*	*	*	292	228
Latvia	*	1,159	964	698	645
Esthonia	813	1,207	825	517	411
European Russia (without Ukraine)	29,799	26,333	24,645	26,710	30,308
Ukraine	*	*	14,516	13,069	13,353

CASES OF DIPHTHERIA NOTIFIED IN VARIOUS COUNTRIES, 1919-1923 (*contd.*).

Countries	1919	1920	1921	1922	1923
Asia :					
Transcaucasia	*	*	*	644	481
Kirghiz Republic	*	*	*	940	379
Turkestan	*	*	568	270	263
Siberia	*	*	*	686	2,986
Straits Settlements (*deaths*)	11	25	13	13	12
Hong-Kong	50	76	85	71	88
Japan	14,280	15,173	14,522	13,969	12,867
Africa :					
Egypt	977	810	873	*	1,137
Algeria	158	192	726	370	439
Union of South Africa	1,036	1,110	1,014	540	885
America :					
Ontario Canada))	4,261	5,940	6,313	3,529	2,935

* No information available.

CASES OF DIPHTHERIA NOTIFIED IN VARIOUS COUNTRIES, 1919-1923 (*contd.*).

Countries	1919	1920	1921	1922	1923
The United States (36 States)	127,158	143,350	196,618	159,509	134,575
Porto Rico	98	149	99	116	262
Habana (Cuba)	79	78	64	95	130
Rio de Janeiro (*deaths*)	108	62	60	94	49
Australasia :					
Australia	11,858	16,024	24,783	14,156	9,915
New Zealand	3,499	2,442	2,611	1,989	1,936

The statistics of diphtheria have shown, during the last three or four years, a definite decline of this disease in so widely separated regions of the world as Northern, Western and Central Europe, North America, Japan and Australia.

The incidence has diminished constantly since 1920 in *England and Wales* and *Scotland*; the quarterly data are given below for some of the large English counties.

CASES OF DIPHTHERIA NOTIFIED IN CERTAIN COUNTIES OF ENGLAND AND WALES DURING EACH QUARTER OF 1922 AND 1923.

Counties	1922				1923				Total	
	I	II	III	IV	I	II	III	IV	1922	1923
London	4,177	3,503	3,630	3,962	3,417	2,452	2,035	2,449	15,272	10,353
Chester	356	335	238	277	336	163	195	171	1,206	865
Essex	638	509	499	656	534	342	357	539	2,302	1,772
Gloucester	524	296	212	266	295	170	172	334	1,298	971
Kent	593	355	333	344	195	210	212	224	1,625	841
Lancaster	1,507	1,049	935	1,270	1,352	911	830	900	4,761	3,993
Middlesex	1,161	680	667	736	573	445	366	414	3,244	1,798
Southampton	430	367	274	296	377	314	287	305	1,367	1,283
Stafford	375	320	306	358	365	319	211	322	1,359	1,217
Surrey	514	296	263	281	233	206	165	187	1,354	791
Warwick	470	319	316	539	650	391	476	514	1,644	2,031
Yorkshire West Riding	1,048	751	665	822	831	641	507	630	3,286	2,609
Glamorgan	520	380	303	446	550	383	338	490	1,649	1,761

In *Sweden* and *Norway* the decline of diphtheria has been constant since 1919, a year of very high incidence; 7,808 cases were notified in Sweden, in 1923, as against 6,610 the previous year and 40,514 in 1919. The reported incidence declined in *Denmark* from a maximum of 13,945 cases in 1921 to 5,680 in 1923. A similar decline occurred in the countries of Central Europe, only about half as many cases having been notified in 1923 as in 1921 (in *Germany*, 31,942 as against 63,018). The statistics for *France* and *Spain* also indicate an increasing incidence of the disease up to 1921 and, since then, a decline which is less marked, however, than in Germany. Smaller changes during the last years are indicated by the data for *Italy*, where the disease appears to be less prevalent than during the war :

Years	*Cases reported.*	*Years*	*Cases reported.*
1914	19,409	1919	11,103 *
1915	19,200	1920	12,619 *
1916	17,769	1921	12,081
1917	21,173 *	1922	11,347
1918	17,614 *	1923	10,922

* Incomplete data.

The differences between the incidence of diphtheria in 1922 and 1923 reported in the countries of East-Central, South-Eastern and Eastern Europe is generally small, some provinces showing an increase, others a decrease, as shown by the tables below.

CASES OF DIPHTHERIA NOTIFIED IN THE KINGDOM OF THE SERBS, CROATS AND SLOVENES, 1922-1923.

Provinces	1922		1923	
	Cases	*Deaths*	*Cases*	*Deaths*
Serbia	907	137	536	55
Croatia-Slavonia	338	50	440	94
Slovenia	235	37	299	37
Bosnia and Herzegovina	70	7	304	69
Dalmatia	96	18	111	23
Montenegro	14	6	23	8
Voivodina	275	35	230	16
Total	1,935	290	1,943	302

CASES OF DIPHTHERIA NOTIFIED IN ROUMANIA, 1922-1923.

(*Provisional figures.*)

Regions	1922 *Cases*	1922 *Deaths*	1923 *Cases*	1923 *Deaths*
ld Kingdom	396	74	492	50
rdeal (Transylvania)	698	110	637	87
ssarabia	335	22	158	12
ukovina	40	14	117	10

A higher incidence, in 1923, was shown in the Western rovinces of Poland, while fewer cases than in 1922 ere reported in the Eastern provinces.

CASES OF DIPHTHERIA NOTIFIED IN POLAND, 1922-1923.

Zones	1922 *Cases*	1922 *Deaths*	1923 *Cases*	1923 *Deaths*
astern	1,596	92	1,002	59
ast Central	1,113	153	999	152
est Central	600	97	735	103
estern	902	89	3,674	425

Little change in the prevalence of the disease in ussia is indicated by the official notifications.

CASES OF DIPHTHERIA NOTIFIED IN RUSSIA, BY GEOGRAPHICAL REGIONS, 1922-1923.

Regions	1922	1923
Northern	511	559
Western	3,427	3,729
Central	7,237	6,861
Middle Volga	5,228	5,853
Eastern	2,288	2,373
South Central	3,092	5,199
Ukraine	13,069	13,353
Southern	1,882	2,526
Transcaucasia	644	481
Crimea	303	425
Kirghiz	940	379
Turkestan	270	263
Siberia	686	2,986
Railways and Waterways	2,721	2,777
Prisons	21	6
Total	42,319	47,770

The incidence of diphtheria appears to have diminished slightly in *Japan* since 1920. The very high mber of deaths in proportion to the cases may dicate that these are incompletely reported :

Years	*Cases*	*Deaths*
1921	14,522	3,501
1922	13,969	3,251
1923	12,867	3,091

Diphtheria appears to have spread in the *United ates* from 1919 to 1921 and diminished again in 922 and 1923. The incidence was slightly higher, owever, in 1923 than during the previous year in belt stretching from Wisconsin westward to the acific Coast and including most of the Rocky ountains and Coast region.

CASES OF DIPHTHERIA NOTIFIED IN THE UNITED STATES, 1919-1923.

States	1919	1920	1921	1922	1923
New England :					
Maine	363	616	949	599	454
New Hampshire	*	521	736	364	350
Vermont	232	—	407	341	250
Massachusetts	7,928	7,513	9,100	8,826	9,050
Rhode Island	1,029	1,369	1,052	962	806
Connecticut	3,388	3,754	3,361	2,924	2,428
Middle Atlantic :					
New York	25,077	24,806	27,029	18,868	15,048
New Jersey	7,270	6,931	7,901	7,613	5,983
Pennsylvania	17,717	16,959	20,794	16,617	15,893
South Atlantic :					
Delaware	*	237	193	145	182
Maryland	2,747	2,561	2,597	2,646	2,344
District of Columbia	1,169	713	935	735	565
Virginia	3,108	3,993	5,638	7,109	4,121
North Carolina	3,519	3,422	5,136	8,136	4,671
South Carolina	2,129	2,158	2,992	2,914	2,204
Georgia	1,551	1,436	1,531	1,812	1,098
Florida	510	578	865	901	619
East South Central :					
Kentucky	*	*	*	2,553	*
Tennessee	*	*	3,091	1,299	960
Alabama	1,256	1,053	1,507	1,330	1,568
Mississippi	1,676	2,225	3,095	2,387	1,766
West South Central :					
Arkansas	738	1,115	891	557	499
Louisiana	629	599	760	1,088	1,201
Oklahoma	*	*	1,202	391	714
Texas	*	2,419	2,203	2,044	1,364
East North Central :					
Ohio	7,255	8,587	17,847	12,454	10,038
West Virginia	2,244	2,073	3,938	2,653	1,989
Indiana	2,603	2,566	6,542	4,625	4,088
Illinois	9,911	14,108	20,793	15,162	10,716
Michigan	6,998	10,407	12,099	8,513	7,158
Wisconsin	2,185	3,485	5,175	3,593	4,400
West North Central :					
Minnesota	4,541	3,616	4,380	4,253	4,075
Iowa	997	1,195	2,053	2,273	1,646
Missouri	*	*	*	3,920	4,193
North Dakota	394	763	863	450	713
South Dakota	295	516	660	610	723
Nebraska	423	909	1,638	1,290	989
Kansas	2,077	4,375	8,412	4,116	2,800
Mountain Region :					
Montana	366	269	412	426	456
Idaho	*	145	254	244	175
Wyoming	124	89	186	120	70
Colorado	557	1,006	2,619	2,260	2,590
New Mexico	*	823	1,400	1,188	1,157
Arizona	*	87	179	124	192
Utah	434	*	651	*	*
Nevada	*	*	5	38	12
Pacific Coast :					
California	3,073	5,784	9,465	8,714	9,540
Oregon	308	498	2,047	796	1,087
Washington	1,003	1,353	1,356	1,177	1,179
Total	127,824	147,632	206,939	172,160	144,124

* Data not available.

Also in *Australia* was 1921 a year of high diphtheria prevalence, 24,783 cases having been notified that year, while only 9,915 cases were reported in 1923. The seasonal distribution, in the latter year, is indicated below.

CASES OF DIPHTHERIA NOTIFIED IN AUSTRALIA, EACH QUARTER OF 1923.

States	I	II	III	IV	192
New South Wales	894	1,100	870	635	3,49
Victoria	734	1,074	806	528	3,14
Queensland	214	308	290	254	1,06
South Australia	201	283	241	119	84
Western Australia	109	128	135	122	49
Tasmania	270	241	229	130	87
Total	2,422	3,134	2,571	1,788	9,91

MEASLES

CASES OF MEASLES NOTIFIED IN VARIOUS COUNTRIES, 1919-1923.

Countries	1919	1920	1921	1922	1923
Europe :					
England and Wales *(death)*	3,534	7,190	2,241	5,694	5,316
Scotland	1,510	2,037	177	3,266	554
Norway	1,444	5,936	5,649	3,647	2,150
Denmark	22,157	27,758	5,181	9,596	32,166
Switzerland	9,127	15,194	3,070	3,930	10,316
France	14,002	17,489	16,644	12,019	34,585
Spain *(deaths)*	2,868	5,813	5,390	6,408	4,048
Italy	56,401	94,223	96,725	46,471	51,971
Bulgaria	9,072	10,772	25,710	8,700	10,264
Hungary	*	*	51,172	7,465	16,414
Poland	6,933	10,831	23,143	23,830	22,159
Latvia	*	1,036	3,062	715	315
Esthonia	1,754	1,032	1,785	2,811	2,092
Asia :					
Irak	*	*	605	87	461
Africa :					
Egypt	3,514	9,244	3,048	*	17,871
Algeria	159	296	726	1,647	692

* Data not available.

CASES OF MEASLES NOTIFIED IN VARIOUS COUNTRIES, 1919-1923 (*contd.*).

Countries	1919	1920	1921	1922	192
The United States (36 States)	177,605	456,676	254,167	256,326	694,52
Habana (Cuba)	82	885	147	11	7
Hawaii	135	631	358	1,388	1,14
Rio de Janeiro *(deaths)*	659	65	95	653	17

Measles appears frequently in large epidemics, bu these are rarely of pandemic extension. In 1923 severe outbreaks occurred in the United States, Egyp and Denmark, while the incidence was low in man other countries. The seasonal incidence is mor erratic than is the case with most other epidemi diseases; thus, the maximum incidence, in 1923 occurred in January in Switzerland, in March i England and Wales, in May in France and in th United States, in May and July in Italy, in July i Spain, in March and July in Egypt, and in Novembe in Denmark. It is seen that epidemics may develo under so widely different climatic conditions as i Scandinavian winters and Egyptian summers. Th monthly distribution of the reported cases is give below for a few countries.

SEASONAL DISTRIBUTION OF CASES OF MEASLES NOTIFIED IN VARIOUS COUNTRIES, 1923.

Countries	*Jan.*	*Feb.*	*Mar.*	*April*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Total*
Denmark	2,461	2,380	2,303	1,736	2,220	1,875	1,650	1,127	1,352	4,415	5,894	4,753	32,166
Switzerland	2,388	1,810	1,296	884	1,172	869	699	238	86	275	310	289	10,316
France	3,751	5,124	5,668	4,438	5,308	4,295	2,862	986	399	552	569	633	34,585
Spain *(deaths)*	297	322	375	341	368	448	555	412	184	236	264	246	4,048
Hungary	695	708	1,020	2,028	3,108	2,651	1,551	397	285	740	1,733	1,798	16,414

	Four-weekly Periods													
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	
England and Wales *(deaths)* *	296	307	409	394	289	315	215	147	74	48	58	126	214	2,89
Italy	2,369	3,107	4,932	5,433	6,292	5,206	6,106	4,728	2,059	1,682	1,504	3,703	4,850	51,97
Egypt	1,281	2,155	2,918	2,441	2,141	2,151	2,378	970	649	418	187	96	86	17,87
The United States (27 States)	20,530	26,807	38,179	54,601	75,160	66,645	29,294	9,479	3,948	4,008	10,097	20,068	32,458	391,27

* Cities only.

The 17,871 cases notified in *Egypt* represent probably only a fraction of the true incidence, because the disease is reported to have caused 7,673 deaths in 1923. The disease was epidemic the same year also in *Palestine*, about 5,000 cases having been notified.

The increase of measles, in 1923, has been genera throughout the *United States*, as shown by the table below:

CASES OF MEASLES NOTIFIED IN THE UNITED STATES, 1919-1923.

Regions	1919	1920	1921	1922	1923
New England	17,869	47,948	33,442	36,204	53,317
Middle Atlantic	70,366	180,461	75,366	132,912	190,837
South Atlantic	16,873	27,642	41,493	15,402	130,498
East South Central	4,321	2,565	8,004	6,575	53,220
West South Central	1,033	4,457	8,041	2,159	14,234
East North Central	54,023	138,431	54,551	64,517	189,415
West North Central	6,975	24,533	16,806	6,142	58,889
Rocky Mountains	1,782	12,483	24,148	451	13,645
Pacific Coast	6,270	29,528	20,203	1,543	40,543
Total	179,512	468,048	282,054	265,905	744,598
No. of States reporting	38	42	47	48	47

WHOOPING-COUGH

Whooping-cough is notifiable in very few countries, and the available information reveals at present no general tendency of the disease; the incidence appears to have been high in Denmark, Roumania and the United States, while Great Britain, Norway, Switzerland and Poland report fewer cases in 1923 than during the previous years. This disease has its maximum incidence among very small children and earlier in life than any other epidemic disease; the number of deaths caused by it is, therefore, frequently considerable.

CASES OF WHOOPING-COUGH NOTIFIED IN VARIOUS COUNTRIES, 1919-1923

Countries	1919	1920	1921	1922	1923
Europe :					
England and Wales *(deaths)*	2,605	4,401	4,576	6,370	4,162
Scotland	262	250	326	12	0
Norway	4,119	6,116	2,137	6,185	4,580

CASES OF WHOOPING-COUGH NOTIFIED IN VARIOUS COUNTRIES, 1919-1923 (*contd.*).

Countries	1919	1920	1921	1922	1923
Denmark	33,278	19,943	5,037	22,060	26,315
Switzerland	3,121	2,514	1,675	3,439	1,571
Spain *(deaths)*	1,749	3,502	1,558	1,218	1,974
Bulgaria	3,531	4,696	4,979	2,277	3,636
Roumania	9,310	21,842	6,527	9,675	18,872
Hungary	*	*	2,656	2,669	2,736
Poland	1,126	3,674	4,356	8,219	4,367
Latvia	*	604	449	510	479
Esthonia	436	232	215	1,417	971
America :					
Ontario (Canada)	1,163	2,042	2,307	1,691	3,205
The United States	*	*	*	106,212	161,059
Rio de Janeiro *(deaths)*	395	189	45	261	546

* Data not available.

LEPROSY

It is not possible to base a general survey of the incidence of leprosy throughout the world upon the current data so far received by the Health Section of the League of Nations. Leprosy is notifiable in 41 out of the 72 countries which sent current reports to the Health Section in 1923, but from only 14 of these has any information on new cases received:

Europe :	*New Cases*
Austria	1
Esthonia	25
France	1
Latvia	37
Asia :	
Cyprus	8
Africa :	
Algeria	3
Australasia :	
Australia	1
New Zealand	0
America :	
The United States	35
Mexico City	16
Costa Rica	2
Dominican Republic	2
Panama Canal Zone	9
Uruguay	2

The following data are available chiefly from the annual reports of the mandated territories :

NUMBER OF LEPERS UNDER TREATMENT, 1923.

Asia :	*No. of Lepers*
Palestine	80
Africa :	
Togo (French Mandate)	1,500
Togo (British Mandate)	Endemic and common
Cameroons (French Mandate)	1,483
Cameroons (British Mandate)	35
Tanganyika (British Mandate)	about 6,000
Ruanda Urundi (Belgian Mandate)	50*
South-West Africa (South African Mandate)	1*
South Sea Islands :	
Nauru (British Mandate)	150
Saipan (Japanese Mandate)	8*
Jalnit (Japanese Mandate)	48*

* New cases.

HUMAN TRYPANOSOMIASIS

(African Sleeping-Sickness).

Only six of the countries (or territories) which regularly send information regarding disease incidence to the Health Section of the League of Nations furnish data on human trypanosomiasis. These are Algeria, Kenya, Nyasaland, Sierra Leone, Uganda, and the Union of South Africa. The occurrence of trypanosomiasis during 1923 was not reported from any of these countries to this Section.

However, the available reports on the administration of the mandated territories in Equatorial Africa for 1923 give the following information :

	Cases
Togo (British Mandate)	— [1]
Togo (French Mandate)	10 [2]
Cameroons (British Mandate)	— [3]
Cameroons (French Mandate)	30,000 [4]
Ruanda Urundi (Belgian Mandate)	34 [5]
Tanganyika (British Mandate)	49 [6]

The 1922 reports, in addition to those above quoted, give the following information concerning the incidence of the disease:

Uganda	138 cases, 31 deaths.
Nyasaland	8 cases reported: probably more prevalent.
Kenya	Suspected cases. No laboratory confirmation.
Sierra Leone	1 suspected case.

For more complete information concerning the general prevalence of human trypanosomiasis in Equatorial Africa the reader is referred to the "Interim Report on Tuberculosis and Sleeping-Sickness in Equatorial Africa", by the Expert Committee appointed by the Health Section of the League of Nations, 1922, submitted to the Health Committee May 26th, 1923.

TRACHOMA

In certain countries, such as Egypt and Palestine, for example, the absence rather than the existence of trachoma in an individual is remarkable. Notification of new cases in these countries, where the disease affects from 70% to 95% of the population, is not generally practised. Rather are the numbers of cases treated in the special hospital units recorded, with details as to stage of disease, form of treatment, and the number of consultations. Until recently only this type of information was available, and even now in those countries where trachoma has been made a notifiable disease the incipient cases are not differentiated in the reports from old or chronic cases. This may be due in part to the difficulty of making a diagnosis in early cases in those countries where conjunctivitis of one form or another is practically universal.

In certain other countries, notably those in which medical inspection of school-children has been well developed, the notification of new cases may have certain special value.

Reports on newly diagnosed cases of trachoma were received by the Health Section of the League of Nations from only nine countries during 1923; seven in Europe (Austria, Czechoslovakia, Danzig, Esthonia, Germany, Poland and Switzerland) and two outside of Europe (New Zealand and the Panama Canal Zone). In these latter two countries, and in Switzerland, the disease does not seem to present a serious problem, the numbers of cases reported during 1923 being 5, 3 and 8, respectively.

For the other countries mentioned above, and for the Serb-Croat-Slovene Kingdom, for which 1922 data only are available, the following information has been received :

CASES OF TRACHOMA NOTIFIED IN CERTAIN COUNTRIES 1919-1923.

Countries	1919	1920	1921	1922	1923
Austria	111	167	219	320	37
Czechoslovakia . .	4,251	3,308	3,252	2,796	3,33
Danzig	23	43	38	11	1
Esthonia	182	186	492	467	52
Germany	*	*	1,887	1,522	1,19
Poland	1,570	1,556	2,425	2,737	4,06
Kingdom of the Serbs, Croats and Slovenes	*	*	*	6,503	

It is probable that the decline recorded in *Germany* during the past three years represents an actual decrease in the number of new cases — only 1,095 being reported in *Prussia* in 1923 as against 1,398 in 1922 — but the conclusion that the disease is increasing in Austria, Czechoslovakia, Esthonia, and Poland is not warranted. The apparent increase is more probably due to increased activity on the part of the health authorities in those countries in combating the disease.

For example, the apparent increase in *Poland* in 1923 is due entirely to an increased number of cases reported from the district of Lodz, where 2,541 cases were notified in 1923 as against 822 in 1922. The increase reported from *Czechoslovakia*, when analysed, shows that the number of cases reported from Moravia and Silesia was less by 160 in 1923 than in 1922, whereas in 1923 the province of Slovakia reported 1,890 as compared with 982 in 1922.

These data present only a very imperfect picture of the trachoma problem. The absence of information concerning the incidence of the disease in the Mediterranean countries, in Russia, Roumania, China and Japan and other Eastern countries, where the prevalence is known to be high, make the report incomplete and inconclusive.

(1) No case reported 1923. "Extremely rare" 1922.

(2) Under treatment September 1923 at Klouta.

(3) No case reported 1923. "Tsetse flies are present and it is probable that sleeping-sickness occurs". One case reported 1922.

(4) A survey of the contaminated regions showed 30,000 cases out of approximately 100,000 persons examined.

(5) Hospitalised at Usumbura on Lake Tanganyika.

(6) This number refers to the outbreak in the Mwanza, where 92 cases occurred in 1922. For the whole territory in 1922 the Chiefs of the villages reported 591 deaths and the Medical Officers 92 deaths.

* Data not available.

ANTHRAX

Anthrax was included in the list of diseases for which eturns were sent to the Health Section during 1923 om only the Eastern and Central European coun- ies, from Denmark, Finland, Switzerland, the Serb- roat-Slovene Kingdom and Bulgaria.

Outside of Europe, the United States, Uruguay nd the City of Rio de Janeiro in America, Australia, ne Union of South Africa, and Iraq gave information oncerning the incidence of the disease during the ear. These data follow :

Countries	*Cases* 1922	*Cases* 1923	*Deaths* 1922	*Deaths* 1923
ustria	13	8	—	1
ulgaria	—	1	—	0
zechoslovakia	69	42	—	3
anzig	—	1	—	0
enmark	—	1	—	—
sthonia	—	0	—	—
inland	—	0	—	—
ermany	125	105	—	—
ungary	—	0	—	1
atvia	7	2	—	—
ithuania	3	14	—	2
oland	56	57	—	11
ussia	,904	7,801	—	—
ingdom of the Serbs, Croats and Slovenes*	—	83	—	16
witzerland	—	2	—	—

The regional distribution of the disease in Russia, reported to the Health Section, is given in the llowing table :

CASES OF ANTHRAX NOTIFIED IN RUSSIA, BY REGIONS, 1922-1923.

Regions	1922	1923
Northern	25	46
Western	27	120
Central	250	416
Middle Volga	1,303	1,334
Eastern	119	359
South Central	405	996
Ukraine	1,153	2,309
Southern	341	1,198
Transcaucasia	188	285
Crimea	66	147
Kirghiz	—	178
Turkestan	24	92
Siberia	3	342
Railways and Waterways	—	145
Total	3,904	7,801

For the non-European countries, *Iraq* reported 8 cases in 1923 as against 6 the preceding year; two States in *Australia* — Victoria and Southern Australia — reported a total of 3 cases; *Uruguay* reported 186 cases with 31 deaths, and the City of *Rio de Janeiro*, 1 case. Fifty cases were reported from the *United States*. The United States Public Health Reports contained the information that 7 cases and one death from anthrax occurred in the *Union of South Africa* in January.

The annual report on the administration of the territory of *South-West Africa* states that 11 cases of anthrax, with 3 deaths, occurred among the Klip kaffirs in Rehoboth from eating the flesh of infected animals. Several cases of intestinal anthrax were reported, unofficially, to have occurred in 1923 in the Government of Tambov in *Russia*, where contaminated sausage was said to have been the mode of transmission.

* Month of July only.

RABIES

Rabies was mentioned in the current epidemiological ports of only eight European countries, and three untries outside Europe, during 1923. These data e as follows

urope :	*Cases*	*Deaths*
Austria	4	3
Belgium	1	—
Czechoslovakia	22	22
Danzig	2	—
Esthonia	2	—
Germany	74	—
Latvia	21	—
Poland	2,572*	36

Africa :	*Cases*	*Deaths*
Tunis	6	—
Union of South Africa**	—	1
America :		
The United States	44	—

The percentage of animal bites resulting in death from rabies was less in 1923 in *Poland* than in 1922, where 1,997 cases of bite were reported in the earlier year, with 37 deaths, and 2,572 bites and 36 deaths in 1923. In *Germany*, for which data regarding the fatality are lacking, 74 cases of rabies were reported in 1923 as against 52 in 1922. *Austria* reported 413 cases of dog-bite with only 3 deaths from rabies during 1923.

The annual administrative report from *Palestine* records 11 cases of rabies, all of which were fatal.

* Including all cases of anima. bites.

** Data not reported.

TABLES

OF

Notifiable Diseases

in 1923

EUROPE

ALLEMAGNE — GERMANY

(Population: 61 570 000. E. 1er janvier 1923).

Nombre de cas de maladies à déclaration obligatoire constatés en Allemagne, 1919-1923; par semaines en 1923.
Number of Cases of Notifiable Diseases reported in Germany, 1919-1923; by weeks in 1923.

Source: Veröffentlichungen des Reichsgesundheitsamts, Berlin.

Semaine finissant Week ended	Anthrax	Diphterie Diphtheria	Dysenterie Dysentery	Fièvre puerpérale Puerperal fever	Fièvre récurrente Relapsing fever	Fièvre typhoïde Enteric fever	Meningite cérébro-spinale Cerebro-spinal meningit	Rage humaine Rabies	Scarlatine Scarlet fever	Trachome Trachoma	Trichinose Trichinosis	Typhus ex. Typhus	Variole Smallpox
Total 1919	18											3549	5012
Total 1920	35											483	2042
Total 1921	80	63018	31624	8006	53	18808	696	43	48281	1887	16	533	688
Total 1922	129	37949	5036	6422	31	10993	1622	52	32448	1522	110	386	215
Total 1923	106	31942	8449	5592	4	13162	1155	64	27234	1192	25	27	17
Janvier-January 6	0	706	25	107	0	140	18	3	553	17	0	0	0
13	5	809	29	114	0	162	20	3	664	22	0	0	0
20	2	783	46	138	0	131	26	2	622	15	0	2	0
27	1	750	34	124	0	122	21	0	573	15	0	0	0
Février-February 3	1	695	29	134	0	126	26	0	547	26	0	0	1
10	2	713	33	142	0	108	32	1	547	34	0	0	0
17	1	688	34	115	0	120	26	0	538	16	6	4	0
24	2	718	29	131	0	143	31	0	599	24	3	0	0
Mars-March 3	4	702	50	126	0	142	52	0	535	27	1	1	0
10	4	744	37	111	0	124	38	0	545	26	0	0	0
17	0	699	64	120	0	176	33	1	566	16	1	2	1
24	0	795	67	140	0	155	38	1	579	26	0	1	2
31	0	640	56	110	0	129	26	0	433	31	0	2	1
Avril-April 7	1	639	42	134	0	143	42	1	465	18	0	0	1
14	4	678	36	144	0	150	36	0	453	21	0	0	0
21	1	709	66	128	0	162	24	1	488	18	0	0	0
28	2	727	56	144	0	149	36	2	473	76	0	0	0
Mai-May 5	5	658	76	117	1	148	30	0	500	31	0	0	1
12	2	589	52	98	0	145	13	0	518	44	0	0	0
19	1	565	53	105	0	205	33	2	537	21	0	8	3
26	1	510	55	104	0	194	31	0	453	25	0	1	0
Juin-June 2	1	575	51	92	0	168	24	1	453	18	0	1	0
9	3	527	62	108	0	195	26	1	475	25	0	0	1
16	3	520	50	93	0	168	18	1	470	14	2	0	0
23	4	562	79	104	0	256	25	1	499	22	0	0	0
30	1	526	65	89	0	255	34	1	453	34	0	0	0
Juillet-July 7	1	526	63	84	0	250	25	0	415	29	0	0	0
14	3	469	62	92	0	288	21	3	442	19	1	0	0
21	2	551	114	100	0	318	21	2	399	24	0	0	0
28	2	489	227	87	0	301	32	1	325	25	0	0	0
Août-August 4	5	465	228	65	0	260	19	0	342	16	0	1	1
11	1	475	345	82	1	410	22	0	356	48	0	0	0
18	1	487	599	82	2	410	15	3	383	16	0	0	1
25	1	426	815	78	0	415	21	1	391	19	0	1	0
Sept.-Sept. 1	2	471	815	82	0	399	24	2	481	35	0	0	0
8	3	551	703	97	0	396	16	1	566	35	0	0	0
15	2	536	557	105	0	357	10	0	597	17	5	0	1
22	3	603	648	102	0	412	18	0	716	20	5	0	1
29	1	515	445	95	0	480	14	0	672	22	0	2	0
Oct.-Oct. 6	1	585	277	102	0	411	9	3	637	8	0	0	0
13	1	578	193	98	0	359	12	2	599	15	0	0	0
20	1	602	226	87	0	358	5	0	656	19	0	0	0
27	0	663	133	94	0	357	11	3	629	17	0	0	1
Nov.-Nov. 3	2	614	119	111	0	302	12	0	639	20	0	0	1
10	2	613	116	100	0	334	8	1	568	5	0	0	0
17	1	675	102	96	0	342	5	17	657	22	0	0	0
24	2	643	96	133	0	431	15	2	548	30	0	0	0
Déc.-Dec. 1	3	684	52	101	0	303	7	0	586	20	0	0	0
8	2	623	89	111	0	339	15	0	509	17	0	1	0
15	3	643	75	121	0	293	12	0	595	12	0	0	0
22	5	667	37	122	0	313	14	0	605	16	1	0	0
29	5	561	37	93	0	208	13	1	383	4	0	0	0

Pas de cas de choléra asiatique ou de peste, 1919-1923. — No case of Asiatic cholera or plague, 1919-1923.

NATALITÉ ET MORTALITÉ DANS LES VILLES ALLEMANDES DE PLUS DE 100.000 HABITANTS 1919-1923

BIRTHS AND DEATHS IN GERMAN CITIES WITH MORE THAN 100,000 POPULATION: 1919-1923.

Source: Veröffentlichungen des Reichsgesundheitsamts, Berlin.

Classement des naissances et des décès	1919 [1] Pop. 14 496 000 48 villes – 48 cities		1920 [1] Pop. 14 855 000 49 villes – 49 cities		1921 [1] Pop. 16 347 000 47 villes – 47 cities		1922 [2] Pop. 16 432 000 46 villes – 46 villes		1923 [2] Pop. 16 662 000 46 villes – 46 cities		Classification of Births and of Deaths
	Nombre Number	Taux par Rate per 1000	Nombre Number	Taux par Rate per 1000	Nombre Number	Taux par Rate per 1000	Nombre Number	Taux par Rate per 1000	Nombre Number	Taux par Rate per 1000	
Naissances	257725	17.8	326461	22.0	24273	19.8	285681	17.4	250099	15.0	Births
Mort-nés	8717	0.6	11775	0.8	12083	0.8	11029	0.7	9388	0.6	Still-births
Décès, total	221760	15.3	217580	14.6	207131	12.7	219680	13.4	210724	12.6	Deaths, total
Décès, non résidents exclus	204180	14.1	199311	13.4	191401	11.7	205764	12.6	198611	11.9	Deaths, excluding non-residents
Décès, au-dessous d'un an	30702	2.1	42923	2.9	40087	2.5	36666	2.2	32530	2.0	Deaths under 1 year
Décès dus aux causes mentionnées:											*Deaths by specified cause:*
Coqueluche	1599	0.11	1654	0.11	971	0.06	1514	0.09	1166	0.07	Whooping cough
Diphtérie	2412	0.17	1749	0.12	1390	0.09	1015	0.06	982	0.06	Diphtheria
Dysenterie					*d)* 825	0.07	398	0.02	579	0.03	Dysentery
Fièvre typhoïde	678	0.05	540	0.04	468	0.03	372	0.02	356	0.02	Enteric fever
Fièvre puerpérale	1395	5.24	1663	4.92	1702	*a)* 5.06	1164	*a)* 3.9	1338	*a)* 5.3	Puerperal fever
Méningite cérébro-spin.					*d)* 90	0.01	310	0.02	298	0.02	Cerebro-spin. mening.
Rougeole et rubéole	635	0.04	1169	0.08	993	0.06	969	0.06	2210	0.13	Measles and German measles
Scarlatine	536	0.04	400	0.03	357	0.02	272	0.02	206	0.01	Scarlet fever
Tuberculose, total	37429	2.58	25309	1.70	24964	1.53	26125	1.59	28510	1.71	Tuberculosis, total
Tuberculose, au-dessous de 15 ans									3262	0.20	Tuberculosis, under 15 years
Pneumonie					17830	1.09	22084	1.34	17536	1.05	Pneumonia
Grippe	33710	2.33	39589	2.67	3572	0.22	6856	0.42	*b)* 1358	0.08	Influenza
Autres affections des organes respiratoires									*c)* 2116	0.13	
					7483	0.46	8811	0.54	7385	0.44	Other respiratory diseases
Maladies organiques du cœur									17889	1.07	Organic diseases of the heart
Apoplexie									11160	0.67	Apoplexy
Convulsions, au-dessous de 2 ans									2596	0.16	Convulsions, under 2 years
Diarrhée, total	7739	0.53	10947	0.74	10010	0.61	5983	0.36	6940	0.42	Diarrhœa, total
Diarrhée, au-dessous d'un an	5513	0.38	8868	0.59	7035	0.44	4669	0.28	5098	0.31	Diarrhœa, under 1 year
Cancer									19693	1.18	Cancer
Alcoolisme									81	0.00	Alcoholism
Suicide									4096	0.25	Suicide
Meurtre et homicide	3910	0.27	4359	0.29	4393	0.27			415	0.02	Murder
Exécution	599	0.04	469	0.03	403	0.02	11776	0.72	7	0.00	Execution
Accidents									6068	0.36	Accidents
Autres morts violentes	9053	0.62	8337	0.56	7121	0.44					Other external violences
Autres causes									943	0.06	
	122065	8.42	121395	8.17	113944	7.62	132031	8.03	76796	4.61	Other causes

[1] Résultats définis. — Final figures.
[2] Renseignements hebdomadaires. — Weekly returns.
a) Taux par 1000 naissances, mort-nés inclus. — Rates per 1000 births, including still-births.
b) Avec complications. — With complications.
c) Sans complications. — Without complications.
d) Pas de renseignements pour la ville de Grand-Berlin. — No data for Great Berlin.

ANGLETERRE ET PAYS DE GALLES. — ENGLAND AND WALES.

(Population: 38 158 000 E. 30 juin 1922)

Nombre de cas et de décès dus aux maladies à déclaration obligatoire déclarés en Angleterre et le Pays de Galles, 1919-1923.
Number of Cases of and Deaths from Notifiable Diseases reported in England and Wales, 1919-1923.

Source: Fourth Annual Report of the Ministry of Health, London, 1922–1923.
Rapport special pour l'année 1923. Special Report for the year 1923 (final figures).

Maladie — Diseases		1919		1920		1921		1922		1923	
		C. [1]	D. [2]	C. [1]	D. [2]	C. [1]	D. [2]	C. [1]	D. [2]	C. [1]	D. [2]
Choléra	Cholera	0	0	0	0	0	0	0	0	0	0
Peste	Plague	12	5	3	3	0	0	0	0	0	0
Coqueluche	Whooping cough	*a*	2605	*a*	4401	*a*	4576	*a*	6370	*a*	4162
Diphtérie	Diphtheria	53918	4888	69481	5648	66506	4772	52153	4075	40009	2722
Encéphalite létharg.	Encephalitis letharg.	541	294	890	480	1470	729	454	339	1025	531
Erysipèle	Erysipelas	15763	660	16051	838	13231	729	13171	703	12335	622
Fièvre des tranchées	Trench fever	99	8	39	12	15	7	6	0	3	*
Fièvre jaune	Yellow fever		1	0	0	0	0	0	0	0	0
Fièvre méditerran.	Mediterranean fever	*a*	2	*a*	1	*a*	2	*a*	1	*a*	1
Fièvre récurrente et continue	Relapsing and continued fever	43	7	42	13	46	12	18	8	28	*
Fièvre typhoïde et paratyphoïde	Enteric fever	3447	577	3109	537	3835	613	2414	465	3211	450
Grippe	Influenza	*a*	44801	*a*	10665	*a*	8995	*a*	21498	*a*	8461
Méningite cérébro-spinale	Cerebro-spinal meningitis	848	573	583	412	411	416	344	360	301	284
Ophtalmie des nouveau-nés	Ophthalmia neonatorum	8648	50	10304	46	8313	40	7107	25	6592	16
Paludisme	Malaria	93 *c*	268	32 *c*	250	10 *c*	143	6 *c*	123	3 *c*	81
Pneumonie	Pneumonia	45260	38949	38859	37149	33830	38561 *b*	52513	51235 *b*	44624	36995
Polioencéphalite	Polioencephalitis	62	183	36	134	51	40	31	27	57	40
Poliomyélite	Poliomyelitis	553		293		488	129	355	109	587	79
Rougeole	Measles	*	3534	*a*	7190	*a*	2241	*a*	5694	*a*	5316
Scarlatine	Scarlet fever	82398	1221	119490	1430	137073	1305	108242	1382	85608	993
Septicémie puerpérale	Puerperal sepsis	2016	1157	2898	1730	2211	1171	2134	1079	2191	985
Tuberculose	Tuberculosis										
Pulmonaire	Pulmonary	61154	35984	57844	32791	56334	33505	53422	33919	53387	32097
Non-pulmonaire	Non-pulmonary	16357	10328	15488	9754	15368	9173	15837	8858	17617	8691
Typhus exanthém.	Typhus	3	1	2	0	3	0	13	4	1	1
Variole	Smallpox	294	28	263	30	315	5	973	27	2485	7

a La déclaration des cas n'est pas obligatoire. — Notification of cases is not obligatory.
b Pneumonie grippale comprise. — Influenzal pneumonia included.
c Cas contractés en Angleterre et Pays de Galles. — Cases contracted in England and Wales.
* Chiffres manquent — Figures are not available.
[1] Cas (militaires non-inclus). — Cases (excluding non-civilians).
[2] Décès (militaires compris). — Deaths (including non-civilians).

ANGLETERRE ET PAYS DE GALLES — ENGLAND AND WALES

(Population: 38,158,000 E. 30 juin, 1922)

Nombre de cas de maladies à déclaration obligatoire déclarés en Angleterre et le Pays de Galles, par semaines en 1923.
Number of Cases of Notifiable Diseases reported in England and Wales, by weeks in 1923.

Source: Weekly Returns of Births and Deaths and Cases of Infectious Diseases.

Semaine finissant: Week ended:		Diphtérie Diphtheria	Encéphalite léthar. Encephalitis Leth.	Fièvre puerpérale Puerperal Fever	Fièv. typhoïde et paratyph. Enteric Fever	Méningite cérébrospinale Cerebro-spinal Men.	Ophtalmine des nouv.-nés Ophtalmia Neon.	Pneumonie Pneumonia	Poliomyélite Poliomyelitis	Polio-enceph. Polio Encephalitis	Scarlatine Scarlet Fever	Variole Smallpox
Total 1923 *a* . . .		40009	1025	2191	3211	301	6592	44624	587	57	85603	2485
Janvier — January	6	1063	13	46	43	7	124	968	3	1	2269	12
	13	1027	9	58	34	7	159	971	5	1	2145	48
	20	1013	19	55	43	4	127	897	4	1	2218	46
	27	1107	25	34	32	4	141	950	3	0	2142	48
Février — February	3	1122	30	54	51	7	130	1114	1	0	2190	37
	10	1078	37	43	59	5	131	1086	7	0	2087	27
	17	997	40	46	45	4	125	945	4	0	2015	41
	24	1027	44	49	48	9	118	897	8	1	1891	46
Mars — March	3	990	40	54	46	3	128	989	7	1	1954	45
	10	980	53	55	67	3	147	1019	4	0	1934	53
	17	855	43	56	49	8	117	988	15	0	1763	36
	24	821	48	49	45	8	134	1046	8	0	1825	28
	31	824	50	36	41	6	129	1148	8	0	1644	53
Avril — April	7	808	33	43	43	8	151	1228	4	1	1574	32
	14	755	29	43	55	3	135	1152	6	0	1482	51
	21	836	33	41	57	7	130	1059	5	3	1700	20
	28	748	35	49	43	5	121	1048	5	0	1657	33
Mai — May	5	761	25	41	60	6	142	1277	11	1	1783	33
	12	781	21	54	45	9	132	1425	5	1	1507	24
	19	721	15	38	35	6	112	1155	4	2	1489	34
	26	663	15	41	46	6	134	1021	6	0	1401	18
Juin — June	2	663	18	37	49	7	122	1194	2	1	1414	43
	9	663	22	44	46	15	126	1045	7	0	1503	58
	16	669	18	30	36	10	142	899	4	2	1480	79
	23	632	14	43	41	5	133	878	4	0	1466	141
	30	619	11	32	63	3	133	873	4	0	1499	134
Juillet — July	7	677	16	33	86	3	129	749	11	1	1463	145
	14	632	13	37	63	2	156	711	6	1	1271	148
	21	637	9	34	50	6	136	629	11	2	1162	116
	28	591	8	45	54	5	137	415	8	0	1202	51
Août — August	4	565	5	34	100	9	124	378	7	0	1117	21
	11	577	7	35	105	7	129	394	29	0	1003	28
	18	544	14	32	89	6	132	452	15	4	978	21
	25	585	8	18	91	7	128	358	19	2	1028	20
Septembre — September	1	616	8	33	69	9	107	309	21	2	1097	21
	8	574	6	37	92	3	124	342	32	4	1338	17
	15	705	18	45	123	11	115	480	31	3	1495	27
	22	759	14	47	81	5	128	571	40	0	1470	32
	29	704	13	39	115	7	142	517	31	1	1738	26
Octobre — October	6	704	7	47	97	8	131	596	24	1	1658	32
	13	798	14	41	94	3	128	539	21	1	1879	33
	20	772	10	41	88	5	118	543	26	3	1803	24
	27	828	13	40	90	5	124	640	29	4	1997	22
Novembre — November	3	845	13	52	98	6	104	658	16	2	1984	35
	10	743	12	38	61	7	124	640	10	1	1718	25
	17	749	16	43	59	5	119	776	14	0	1973	44
	24	789	9	38	70	5	99	783	8	2	1786	38
Décembre — December	1	667	16	36	45	6	106	986	10	1	1810	45
	8	748	12	45	61	9	109	1184	9	1	1712	60
	15	765	16	53	53	3	112	1254	8	0	1753	89
	22	724	10	45	66	4	95	1162	6	1	1431	62
	29	633	11	25	38	6	85	1012	2	0	1374	81

Autres maladies déclarées: fièvre continue, 25 cas; fièvre des tranchées, 3 cas; fièvre récurrente, 3 cas; typhus exanthématique, 1 cas. Pas de cas de choléra asiatique, de peste ou de fièvre jaune.
Other diseases notified: continued fever, 25 cases; trench fever, 3 cases; relapsing fever, 3 cases; typhus, 1 cas. No case of Asiatic cholera, plague or yellow fever.

a Les chiffres hebdomadaires sont provisoires; les chiffres totaux sont corrigés
The weekly figures are provisional: the totals for the year are corrected figures.

AUTRICHE — AUSTRIA

(Population: 6 526 661. R. mars 1923)

Nombre de cas de maladies à déclaration obligatoire et de décès dus à ces maladies déclarés en Autriche, 1919-1923; par semaines en 1923.
Number of Cases of and Deaths from Notifiable Diseases in Austria, 1919-1923; by weeks in 1923.

Source: Mitteilungen des Volksgesundheitsamts Wien.

Année et semaine finissant: Year and Week ended:	Diphtérie Diphtheria		Dysenterie Dysentery		Fièvre puerpérale Puerperal fever		Fièvre typh. et paratyphoïde Enteric fever		Méningite cérébro-spinale Cerebro-spinal meningitis		Scarlatine Scarlet fever		Trachome Trachoma
	C.	D.[1]	C.	D.[1]	C.	D.[1]	C.	D.[1]	C.	D.	C.	D.[1]	C.
Total 1919 . .	5578	521	6903	1719	430	261	3944	536	46	37	2932	132	111
Total 1920 . .	5288	508	4212	837	538	345	2761	315	34	20	4635	240	167
Total 1921 . .	3921	313	4733	778	557	329	4288	404	21	17	4210	126	219
Total 1922 . .	2807	216	1196	220	412	226	2303	240	38	33	2658	63	320
Total 1923 . .	2806	261	791	120	400	220	2043	154	38	22	3154	76	379
Janv.—Jan. 6	77	7	8	2	8	5	17	3	1	1	54	1	5
13	58	11	18	2	11	5	21	5	1	1	42	3	6
20	70	5	12	0	8	3	20	2	1	0	52	3	7
27	64	4	6	1	13	5	29	1	1	0	51	2	0
Févr.—Feb. 3	55	11	7	2	13	6	20	3	0	0	43	0	3
10	67	3	14	1	14	8	30	1	0	0	48	1	8
17	83	11	9	1	3	2	15	3	2	0	53	1	3
24	61	7	13	4	9	5	33	2	3	0	47	1	1
Mars—March 3	53	3	9	1	12	9	23	3	0	0	36	0	4
10	69	10	11	5	15	7	23	2	1	1	62	1	6
17	82	5	7	1	7	3	24	3	1	1	61	3	5
24	69	11	7	2	12	7	15	1	0	0	59	2	1
31	57	2	9	2	6	3	19	5	2	0	47	1	4
Avril—April 7	64	12	3	0	9	6	13	3	0	0	46	1	3
14	51	6	16	2	10	7	32	2	2	1	45	4	6
21	57	10	9	2	6	2	22	1	0	1	53	0	2
28	41	4	15	0	13	6	16	3	0	0	52	2	0
Mai—May 5	44	4	8	2	11	10	35	3	0	0	38	0	2
12	55	3	13	5	10	3	24	0	1	0	45	2	4
19	49	3	11	2	13	7	20	2	0	2	58	1	15
26	35	5	14	0	5	4	22	4	1	0	54	2	8
Juin—June 2	46	3	12	2	9	8	27	2	0	0	46	1	3
9	47	2	7	3	6	2	23	2	0	0	50	0	3
16	29	3	9	1	5	4	36	2	1	1	68	1	10
23	51	3	13	0	8	3	37	1	1	0	57	0	4
30	33	2	12	2	2	4	38	5	5	1	57	3	3
Juillet—July 7	46	5	2	0	5	3	41	2	1	1	56	1	48
14	40	2	9	1	6	3	51	2	0	1	44	1	34
21	43	3	14	3	6	2	58	3	1	1	44	1	15
28	21	1	16	0	4	3	46	3	0	2	42	3	5
Août—August 4	30	6	21	3	7	4	73	5	1	0	36	4	9
11	36	1	19	2	5	2	62	2	3	1	46	1	9
18	49	4	21	5	3	2	59	3	0	1	38	0	2
25	48	2	41	2	7	3	80	6	0	1	49	1	8
Sept.—Sept. 1	37	1	29	6	9	8	63	3	0	0	43	0	3
8	40	3	45	8	7	2	57	10	0	0	43	1	12
15	54	6	55	10	9	4	53	5	1	1	70	1	9
22	53	1	33	5	7	4	84	4	2	1	95	2	4
29	49	10	35	2	8	5	94	4	1	1	86	2	6
Oct.—Oct. 6	63	4	35	8	5	4	49	2	0	0	98	4	6
13	74	6	13	4	9	3	63	0	0	0	80	2	5
20	37	6	11	0	2	1	50	1	0	0	97	1	8
27	51	7	16	4	2	3	49	3	0	0	115	1	10
Nov.—Nov. 3	71	4	34	0	12	8	67	2	1	0	96	1	24
10	65	3	18	1	7	2	57	3	0	0	90	0	9
17	74	4	12	2	5	3	41	4	0	0	84	5	6
24	50	4	4	3	6	3	42	6	1	1	73	1	1
Déc.—Dec. 1	65	9	4	3	7	6	24	4	0	0	92	0	1
8	45	3	7	1	10	2	36	0	0	0	76	3	9
15	67	4	10	1	5	0	49	2	0	0	89	1	3
22	71	4	6	0	4	3	27	5	1	0	74	2	8
29	60	8	9	1	5	3	34	4	1	0	74	1	7

Autres maladies notifiées: — Other diseases reported:

Année Year	*Anthrax* Anthrax		*Fièvre récurrente* Relapsing fever	*Lèpre* Leprosy		*Paludisme* Malaria		*Poliomyélite aiguë* Acute Poliomyelitis		*Rage humaine* Rabies		*Typhus exanthém.* Typhus		*Variole* Smallpox	
	C.	D.	C.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
1919	1	0	104	0	0	5754	40	1	0	7	4	996	141	411	96
1920	0	0	0	0	0	—	0	26	0	4	3	86	10	253	46
1921	8	3	1	0	0	123	0	13	0	11	1	81	10	18	1
1922	8	1	1	2	1	—	0	10	0	23	8	23	4	4	0
1923	7	2	0	1	0	—	0	14	0	5	2	3	0	17	0

Pas de cas de choléra asiatique, peste ou fièvre jaune, 1914–1923. — No case of Asiatic cholera, plague or yellow fever, 1919–1923.

[1] Décès constatés par le Bureau fédéral de statistique: — Deaths reported by the Federal Statistical Bureau:

Année Year	*Diphtérie Diphtheria*	*Dysenterie Dysentery*	*Fièvre puerpérale Puerperal Fever*	*Fièvre typhoïde Enteric Fever*	*Scarlatine Scarlet Fever*
1919	691	1819	299	617	220
1920	720	1170	435	382	316
1921	470	1149	434	506	166
1922	364	267	335	318	85

BELGIQUE — BELGIUM

(Population: 7 606 820. E. 31 décembre 1923)

Nombre de cas de maladies transmissibles déclarés en Belgique, 1919-1923; par décades en 1923.
Number of Cases of Communicable Diseases reported in Belgium, 1919-1923; by ten day periods in 1923.

Source: Bulletin du Ministère de l'Intérieur et de l'Hygiène du Royaume de Belgique.

Décade finissant Decade ending		Diphtérie Diphtheria	Dysenterie Dysentery	Encéphalite léthárg. Encephalitis lethargica	Fièvre paratyphoïde et typhoïde Enteric fever	Méningite cérébro-spinale Cerebro-spinal meningitis	Rougeole Measles	Scarlatine Scarlet fever	Septicémie puerpérale Puerperal septicæmia	Variole et varioloïde Smallpox
Total	1919	8080	132	—	1713	63	281	2259	37	42
Total	1920	6409	146	—	1475	38	193	1985	65	91
Total	1921	3914	493	243	1429	35	—	1588	49	21
Total	1922	2279	34	26	1090	50	—	1496	47	23
Total	1923	2353	93	27	1403	56	752	2008	49	31
Janvier —	1-10	62	1	6	33	3	50	72	2	1
January	11-20	80	0	3	28	2	187	77	3	0
	21-31	110	0	5	33	1	15	60	4	0
Février —	1-10	66	0	2	42	0	82	54	4	0
February	11-20	95	0	1	33	1	195	104	3	0
	21-28	68	0	0	21	2	0	34	2	1
Mars —	1-10	79	1	1	30	0	55	68	1	1
March	11-20	92	1	0	19	1	13	32	1	0
	21-31	72	2	1	35	4	0	75	3	2
Avril —	1-10	112	1	3	22	2	102	93	3	1
April	11-20	78	3	0	31	3	23	61	3	0
	21-30	95	0	0	23	1	0	48	0	3
Mai — May	1-10	78	7	0	32	4	1	72	2	0
	11-20	67	1	0	30	4	0	57	1	3
	21-31	80	2	0	28	3	0	63	1	1
Juin — June	1-10	66	0	0	28	3	épid.	50	1	3
	11-20	65	3	0	32	3	épid.	60	2	2
	21-30	62	2	0	33	1	épid.	50	0	0
Juillet — July	1-10	70	0	1	35	1	4	56	0	1
	11-20	66	8	0	27	0	5	53	1	2
	21-31	62	4	0	43	0	0	60	1	0
Août —	1-10	48	10	0	44	1	présent.	44	1	4
August	11-20	32	4	0	30	0	0	21	0	1
	21-31	47	6	1	65	0	10	59	0	2
Septembre —	1-10	31	4	1	43	0	7	21	2	0
September	11-20	48	4	0	81	2	0	29	2	0
	21-30	31	11	0	69	1	0	48	2	0
Octobre —	1-10	65	2	0	72	1	0	42	0	2
October	11-20	51	4	0	67	3	épid.	65	0	0
	21-31	56	0	0	69	1	présent.	53	0	1
Novembre —	1-10	60	0	0	64	3	présent.	66	0	0
November	11-20	41	2	2	44	2	0	39	0	0
	21-30	63	2	0	36	0	0	42	0	0
Décembre	1-10	46	2	0	28	0	présent.	68	2	0
December	11-20	54	0	0	26	1	0	61	1	0
	21-31	55	6	0	27	2	épid.	51	1	0

Autres maladies déclarées: — Other diseases notified:

	Rage humaine Rabies	Typhus exanthém. Typhus	Varicelle Chickenpox
1919.....	4	23	—
1920.....	1	9	—
1921.....	1	11	—
1922.....	0	7	—
1923.....	1	0	1

Pas de cas de choléra ou de peste 1919-1923 — No case of asiatic cholera or plague 1919-1923.

BULGARIE — BULGARIA

(Population: 4 910 151. E. 31 déc. 1921.)

Nombre de cas de maladies à déclaration obligatoire et de décès dus à ces maladies déclarés en Bulgarie, 1919-1923; par mois en 1923.
Number of Cases of and Deaths from Notifiable Diseases reported in Bulgaria, 1919-1923; by months in 1923.

Source: Mouvement des Maladies infectieuses.

Maladie — Disease			Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Janv. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Coqueluche	Whooping cough	C.	3531	4696	4979	2277	3636	144	268	410	265	286	263	302	347	370	500	336	145
		D.	154	266	340	199	212	13	20	33	27	17	23	15	16	11	16	12	9
Diphtérie	Diphtheria	C.	1630	1347	1054	795	1094	92	77	64	48	39	52	67	60	90	146	164	195
		D.	207	194	151	108	157	10	10	11	9	2	8	9	5	20	25	31	17
Dysenterie	Dysentery	C.	793	698	569	740	489	3	2	4	2	13	9	62	128	100	80	60	26
		D.	167	167	103	122	106	0	0	1	1	1	4	12	23	27	24	10	3
Erysipèle	Erysipelas	C.	264	280	967	239	301	20	14	19	3	10	8	12	11	24	56	59	65
		D.	11	19	44	20	17	7	1	1	0	1	0	0	1	3	1	1	1
Fièvre typhoïde	Enteric fever	C.	4192	3080	1915	2867	2799	204	135	132	112	91	63	82	163	332	464	522	499
		D.	541	321	222	301	326	32	31	18	18	14	10	8	12	29	42	63	49
Méningite cérébro-spinale	Cerebro-spinal meningitis	C.	16	17	36	6	12	4	1	0	1	1	0	0	1	1	2	0	1
		D.	10	4	22	3	6	1	1	0	1	0	0	0	0	1	1	0	1
Oreillons	Mumps	C.	398	2283	7434	1034	739	226	168	148	11	4	62	19	5	2	6	5	83
		D.	1	1	5	4	0												
Rougeole	Measles	C.	9072	10772	25710	8700	10264	1223	1846	2265	1590	1139	383	101	83	32	105	621	876
		D.	367	402	1896	434	504	74	55	114	116	33	14	3	14	3	6	24	48
Scarlatine	Scarlet fever	C.	3113	4398	5645	7196	15585	750	661	593	521	700	648	821	1096	1954	2403	3115	2323
		D.	552	760	1453	1211	2935	140	114	118	121	135	157	218	268	343	398	505	418
Typhus exanthém.	Typhus	C.	5671	2885	874	488	413	70	59	70	84	59	8	22	10	7	6	9	9
		D.	726	376	99	68	51	6	11	8	16	7	0	0	1	0	0	0	2
Varicelle	Chickenpox	C.	293	364	802	412	353	58	25	52	6	11	0	7	2	2	17	55	118
		D.	1	3	26	1	1	0	0	0	0	0	0	0	0	0	0	1	0
Variole	Smallpox	C.	874	527	22	24	20	3	2	0	2	6	1	5	0	0	0	0	1
		D.	96	70	5	3	6	1	1	0	1	1	0	2	0	0	0	0	0

DANEMARK — DENMARK

(Population: 3 342 400. E. 31 déc. 1922.)

Nombre de cas de maladies à déclaration obligatoire déclarés en Danemark, 1919-1923; par mois en 1923.
Number of cases of notifiable diseases reported in Denmark, 1919-1923; by months in 1923.

Source: Skematisk Sygeliste for Kongeriget Danmark 1923. Medicinal beretning for den danske Stat 1919-1922.

Maladie — Disease		Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Angine	Tonsillitis	63346	60869	59702	46927	44407	4959	3981	3782	3375	3553	3326	3136	3863	3776	4062	3571	3023
Anthrax	Anthrax	—	—	—	—	1	0	0	0	1	0	0	0	0	0	0	0	0
Bronchite aiguë	Acute bronchitis	68936	66366	56955	71822	78290	11533	9736	8765	6783	6175	4883	3421	3629	4543	6273	6585	5964
Broncho-pneumonie	Broncho-pneumonia	24150	23561	19488	23559	23783	3727	2976	2818	2189	1953	1493	1272	1021	1279	1868	1650	1537
Choléra nostras et entérite	Cholera nostras and enteritis	24908	25287	25571	22202	20189	1611	1230	1210	1215	1487	1490	2566	2623	1958	1865	1492	1442
Coqueluche	Whooping cough	33278	19943	5037	22060	26315	4733	3919	3559	2797	2522	1878	1495	1741	1147	923	864	737
Diphtérie	Diphtheria	9904	13567	13945	7929	5680	920	617	609	452	410	375	344	382	357	394	409	411
Delirium tremens	Delirium trem.	47	56	51	43	62	2	6	7	7	3	5	7	5	4	7	6	3
Dysenterie	Dysentery	5	2	2	3	5	1	3	0	0	0	0	0	0	0	0	1	0
Encéphalite léthargique	Encephalitis lethargica	26	223	138	42	91	12	23	21	7	5	2	5	3	2	6	3	2
Erysipèle	Erysipelas	3662	3697	3742	2994	2738	274	222	257	216	218	212	157	270	238	258	224	192
Fièvre aphteuse	Foot and mouth disease	—	—	—	—	2	0	0	2	0	0	0	0	0	0	0	0	0
Septicémie puerpérale	Puerperal fever	249	330	329	258	253	23	24	19	23	19	29	13	20	21	19	24	19
Fièvre typhoïde	Typhid fever	446	290	295	241	309	9	17	10	10	16	14	45	54	50	39	27	18
Fièvre paratyph.	Paratyph. fever	108	140	127	236	295	3	0	1	3	4	7	20	137	87	24	4	5
Gale	Scabies	19790	18654	17049	11926	9248	1220	838	836	695	796	685	375	648	616	962	882	695
Grippe	Influenza	236215	175736	20153	237635	79779	9200	15533	25810	11415	4093	1972	1207	1156	1624	2467	2677	2625
Hoquet épidém.	Epid. hiccoughs			372	44	234	118	41	47	5	3	5	2	2	4	2	2	3
Méningite cérébro-spinale	Cerebro-spinal meningitis	227	144	92	84	100	4	6	11	14	18	5	8	8	6	8	4	8
Oreillons	Mumps	4053	4773	7503	3293	3972	452	418	400	458	449	375	190	194	147	224	316	349
Paludisme	Malaria	18	15	23	28	16	1	0	1	0	2	0	4	1	5	1	0	1
Pemphigus des nouveau-nés	Pemphigus of new-born	158	146	130	105	89	12	9	12	5	6	12	1	9	5	8	7	3
Pneum. croupale	Croupous pneum.	6596	6144	6253	5736	5659	612	551	632	559	584	509	423	299	284	429	373	404
Poliomyélite aiguë	Acute poliomyelitis	389	60	70	59	75	1	4	3	3	1	3	3	14	10	21	8	4
Rhumatisme articulaire	Rheumatic fever	4432	4233	4336	3952	3653	412	355	338	346	354	287	251	277	218	305	259	251
Rougeole	Measles	22157	27758	5181	9596	32166	2461	2380	2303	1736	2220	1875	1650	1127	1352	4415	5894	4753
Scarlatine	Scarlet fever	8330	12285	11093	5109	3893	522	370	288	355	344	291	246	324	292	336	306	219
Tétanos des nouveau-nés	Tetanus of new-born	65	86	65	67	76	11	3	10	4	6	5	13	7	4	5	4	4
Tuberculose pulmonaire	Pulumonary tuberculosis	3071	2962	3186	3012	2864	280	241	274	254	278	215	262	233	166	257	239	165
Blennorrhagie	Gonorrhœa	14507	11733	11182	10466	11100	953	714	765	765	830	815	1037	1260	1038	1111	1010	802
Chancre mou	Ulcus molle	979	997	771	502	403	42	41	28	28	35	22	37	35	33	27	48	27
Syphilis	Syphilis	4471	4329	3955	2611	2498	250	188	180	202	193	174	175	211	247	245	207	226

Pas de cas de choléra asiatique ou de peste, 1919-1923; un cas de typhus exanthématique en 1919, pas de cas 1920-1923; 7 cas de variole en 1921, pas de cas en 1919, 1920, 1922 ou 1923.

No case of Asiatic cholera or plague, 1919-1923; one case of typhus in 1919, no case 1920-1923; 7 cases of smallpox in 1921, no case in 1919, 1920, 1922 and 1923.

DANTZIG — DANZIG

(Population: 364 380. R. 1er nov. 1923)

Nombre de cas de maladies à déclaration obligatoire et de décès dus à ces maladies à Dantzig, 1919-1923; par semaine en 1923.
Number of Cases of and Deaths from Notifiable Diseases in Danzig, 1919-1923; by weeks in 1923.

Source: Rapports du (Reports from) Gesundheitsverwaltung der Freien Stadt Danzig.

Semaine finissant: Week ended:			Diphtérie Diphtheria		Fièvre typhoïde et paratyphoïde Enteric fever		Scarlatine Scarlet fever		Septicémie puerperale Puerperal septicæmia		Trachome Trachoma	Tuberculose Tuberculosis
			C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
Total 1919			294	27	49	5	207	12	30	13	23	266
Total 1920			322	16	244	12	234	10	95	28	43	259
Total 1921			284	18	179	19	214	11	68	8	38	238
Total 1922			155	6	74	11	133	3	48	14	11	259
Total 1923			135	8	130	13	262	27	29	6	15	253
Janvier	January	6	5	1	0	0	6	0	2	0	0	7
		13	1	0	0	0	2	0	1	0	0	4
		20	2	0	2	0	0	0	2	0	0	6
		27	7	0	0	0	0	0	0	0	0	7
Février	February	3	3	0	2	0	0	0	2	0	5	2
		10	1	0	1	0	2	0	0	0	0	8
		17	4	0	3	0	2	0	1	0	0	1
		24	2	0	0	0	1	0	1	1	0	5
Mars	March	3	0	0	2	0	2	0	0	0	1	4
		10	2	1	0	0	3	1	1	0	0	6
		17	1	1	5	0	2	1	0	0	0	7
		24	5	1	2	0	2	0	1	0	1	6
		31	1	1	0	0	3	0	1	1	0	5
Avril	April	7	2	0	1	0	5	2	0	0	0	6
		14	0	0	1	0	3	0	1	0	1	8
		21	6	0	1	1	3	0	0	0	0	5
		28	5	0	1	0	2	0	1	0	0	6
Mai	May	5	4	0	0	0	3	1	1	0	0	2
		12	3	0	1	1	4	0	1	0	0	7
		19	0	0	1	0	2	0	0	0	0	7
		26	0	0	0	0	1	0	0	0	0	4
Juin	June	2	2	0	1	0	1	0	0	0	0	4
		9	1	0	0	0	4	1	0	0	0	4
		16	0	0	0	0	1	0	0	0	0	6
		23	0	0	5	0	1	0	1	1	0	6
		30	0	0	1	0	5	0	0	1	0	4
Juilet	July	7	0	0	3	0	2	1	0	0	0	3
		14	0	0	5	1	3	0	0	0	1	1
		21	1	0	7	2	5	1	2	0	0	10
		28	2	0	6	0	1	0	2	1	2	1
Août	August	4	3	0	1	2	4	2	0	0	0	5
		11	2	0	0	0	0	0	1	0	0	4
		18	2	0	12	1	3	0	0	0	0	3
		25	10	0	15	1	4	0	1	0	0	3
Septembre	September	1	4	0	4	0	4	0	0	0	0	2
		8	1	0	2	0	5	1	0	0	2	3
		15	1	0	1	0	6	1	1	1	0	6
		22	5	0	4	0	5	0	0	0	0	1
		29	3	0	7	0	13	0	0	0	0	6
October	October	6	3	0	0	0	2	1	0	0	0	4
		13	0	1	1	0	2	0	0	0	0	3
		20	4	0	6	1	9	0	0	0	0	4
		27	1	0	3	1	9	0	0	0	0	11
Novembre	November	3	5	0	0	0	5	3	0	0	0	4
		10	5	0	11	0	10	1	1	0	0	4
		17	6	0	1	0	18	1	0	0	0	7
		24	4	0	2	0	11	1	2	0	0	8
Décembre	December	1	8	0	2	1	15	0	0	0	1	5
		8	2	1	0	0	24	2	1	0	1	1
		15	4	0	2	0	18	2	1	0	0	10
		22	1	1	3	1	14	3	0	0	0	2
		29	1	0	2	0	10	1	0	0	0	5

Autres maladies notifiées: — Other diseases notified:

Année Year	Anthrax Anthrax		Botulisme Botulism		Dysenterie Dysentery		Fièvre récurr. Relapsing fever		Mén. cér.-spin. Cer.-spin. men.		Rage humaine Rabies		Typhus exanth. Typhus		Varicelle Chickenpox		Variole Smallpox	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
1919	0	0	1	0	12	4	0	0	2	0	0	0	39	7	0	0	185	36
1920	0	0	0	0	43	6	2	0	4	1	2	1	7	2	0	0	22	3
1921	0	0	0	0	21	1	1	0	0	1	0	0	0	0	0	0	0	0
1922	0	0	6	1	5	1	0	0	0	0	1	0	3	1	7	0	1	0
1923	1	0	0	0	1	0	0	0	0	0	2	0	2	0	0	0	0	0

Pas de cas ou décès de choléra, fièvre jaune, lèpre, morve ou de peste, 1919-1923.
No case or death from cholera, yellow fever, leprosy, glanders or plague, 1919-1923.

ÉCOSSE — SCOTLAND

(Population: 4 915 500. E. 30 juin 1923)

Nombre de cas de maladies à déclaration obligatoire et de décès causés par ces maladies déclarés en Ecosse, 1919-1923.
Number of Cases of and Deaths from Notifiable Diseases reported in Scotland, 1919-1923.

Source: Rapport spécial de l'Administration sanitaire; Rapport annuel du Registrar-General, 1922; et Quarterly Return of Births, Deaths and Marriages, rapport supplémentaire pour l'année 1923.

Special Report from the Scottish Board of Health; Annual Report of the Registrar-General, 1922; Quarterly Return of Births, Deaths and Marriages, Supplementary Return for the year 1923.

Maladie — Disease		Cas — Cases					Décès — Deaths				
		1919	1920	1921	1922	1923	1919	1920	1921	1922	1923
Choléra	Cholera	1	0	0	0	0	0	0	0	0	0
Diphtérie	Diphtheria	9078	10766	10112	7372	7106	697	699	611	536	492
Dysenterie	Dysentery	217 *c*	276	108	42	60			22	8	
Erysipèle	Erysipelas	3007	3642	3644	3373	3354			313	174	
Fièvre continue	Continued fever	14	26	15	16	45					
Fièvre des tranchées	Trench fever	31 *c*	6	2	0	2					
Fièvre puerp.	Puerperal fever	342	587	624	586	580	150	242	250	228	216
Fièvre typhoïde et paratyph.	Enteric fever	634	743	595	439	794	83	96	87	65	67
Ophtalmie des nouveau-nés	Ophthalmia neonatorum	1431	1871	1897	1485	1390					
Paludisme	Malaria	2856 *c*	1989	308	117	88			18	7	
Pneumonie (primaire et influenzale)	Pneumonia (primary and influenzal)	2913	9155	7854	13951	9039	11094 *a*	6689 *a*	4940 *a*	6617 *a*	4675 *a*
Scarlatine	Scarlet fever	12787	17449	17025	14589	16754	222	245	270	247	352
Tuberculose pulmonaire	Pulmonary tuberculosis	7572 *c*	8099	8030	7752	7080	4294 *b*	4194 *b*	3970 *b*	4061 *b*	3994 *b*
Tuberculose, autres formes	Non-pulmonary tuberculosis	4017	4169	4442	4594	5203	2032	1848	1767	1757	1792
Typhus exanth.	Typhus	38	79	9	42	2	8	16	4	7	1
Variole	Smallpox	9	725	106	7	3	0	152	24	0	0

a Pneumonie toutes formes. — Pneumonia all forms.
b Tuberculose du système respiratoire. — Tuberculosis of the respiratory system.
c A déclaration obligatoire depuis le 1er août 1919. — Compulsorily notifiable from August 1st, 1919.

ESPAGNE — SPAIN

(Population: 21 658 222. E. 31 déc. 1922)

Mortalité par causes en Espagne, 1919-1923; par mois en 1923. — Mortality according to Causes in Spain, 1919-1923; by months in 1923

Source: Boletin de Estadística.

Causes de décès / Causes of Deaths		Total 1919 *	Total 1920 *	Total 1921 *	Total 1922 *	Total 1923 *	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Choléra asiatique	Asiatic cholera	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Choléra nostras	Cholera nostras	142	148	187	104	189	6	1	0	2	1	18	60	58	24	16	2	1
Coqueluche	Whooping cough	1749	3592	1558	1218	1974	102	131	177	189	192	200	200	249	166	120	117	131
Diphtérie	Diphtheria	2639	2723	3037	2878	2289	265	206	205	201	164	125	115	146	176	206	239	241
Fièvre typhoïde	Enteric fever	5677	6998	7041	5438	5131	329	258	233	258	254	314	425	718	745	693	480	424
Grippe	Influenza	21094	17841	5924	8068	8401	628	853	1347	1477	1332	834	386	205	213	322	300	504
Paludisme	Malaria	1937	2044	1918	1527	1262	63	61	79	65	90	111	114	228	166	144	87	54
Rougeole	Measles	2868	5813	5390	6408	4048	297	322	375	341	368	448	555	412	184	236	254	246
Scarlatine	Scarlet fever	675	1235	856	628	471	40	24	48	23	28	32	42	40	43	56	64	31
Typhus exanth.	Typhus	228	155	73	80	68	0	6	4	1	7	1	34	2	0	7	3	3
Variole	Smallpox	3620	3280	2087	1332	529	71	68	35	29	21	20	21	31	33	76	65	59
Autres maladies épidémiques	Other epidemic diseases	2123	2276	2468	2291	2244	132	128	134	118	142	144	260	344	258	230	191	163
Tuberculose pulmonaire	Pulmonary tuberculosis	29751	29991	26953	27395	27389	2425	2163	2508	2507	2410	2216	2211	2301	2158	2049	2142	2299
Tuberculose méningite	Tuberculous meningitis	2267	2158	2047	1978	2181	160	173	210	198	209	238	199	178	160	150	150	156
Tuberculose, autres formes	Other forms of tuberculosis	5486	5293	4577	4148	3977	292	281	306	343	344	334	379	396	316	387	298	301
Cancer et autres tumeurs malignes	Cancer and other malign. tumors	12525	12549	12755	12846	13744	1156	965	1089	1100	1217	1179	1202	1283	1174	1156	1092	1131
Méningite simple	Meningitis, simple	17823	19580	17803	17345	17327	1297	1306	1581	1356	1538	1579	1919	2103	1246	1207	1008	1187
Hémorragie cérébr.	Cereb. hæmorrh.	30222	29034	28506	28821	30120	3484	2900	2732	2539	2304	2122	2095	2386	1936	1941	2575	3106
Maladies organiques du cœur	Organic heart disease	37883	36142	35812	35987	36516	4119	3545	3499	3373	2941	2695	2348	2445	2421	2358	2853	3919
Bronchite aiguë	Acute bronchitis	22166	24952	21014	21939	21910	2377	2463	2635	2682	2128	1600	1244	987	961	1092	1544	2197
Bronchite chronique	Chronic bronchitis	11705	10789	9786	9873	9981	1355	1205	1135	1065	815	675	489	423	489	510	719	1101
Pneumonie	Pneumonia	12172	11245	10585	10268	10152	1250	1044	1110	981	866	701	564	474	549	685	791	1137
Autres affections de l'appareil respir.	Other respiratory diseases	31235	33585	30170	31958	32570	3800	3457	3597	3360	3156	2485	1886	1570	1729	1878	2350	3302
Affections de l'estomac (cancer exc.)	Diseases of the stomach (not cancer)	4192	4011	3778	3720	3761	289	295	289	292	304	281	327	370	297	314	340	363
Diarrhée et entérite (au-dessous de 2 ans)	Diarrhœa and enteritis (under 2 years)	47271	51781	54121	46453	53213	1899	1605	1779	2075	2886	5037	9617	12091	6600	4824	2897	1903
Appendicite et typhlite	Appendicitis and typhlitis	515	606	545	589	589	41	36	49	37	44	40	58	58	77	60	45	44
Hernie, obstruction intestinale	Hernia, intestinal obstructions	3119	3078	3013	2858	2844	249	205	217	225	243	223	235	269	246	254	241	237
Cirrhose du foie	Cirrhosis of liver	3555	3324	3252	3170	3232	251	223	258	261	264	260	262	311	268	284	285	305
Néphrite aiguë et maladie de Bright	Acute nephritis and Bright's disease	11369	12083	12349	11108	11245	1147	1095	959	971	863	830	777	815	807	817	1006	1158
Tumeurs non-cancéreuses et autres aff. des org. génitaux de la femme	Tumors (non-cancerous) & other dis. of the genital org. of wom.	457	450	441	374	373	49	28	40	31	34	25	18	31	18	27	37	35
Septicémie puerp.	Puerp. septicæmia	1917	1931	2073	2081	1831	181	177	172	119	126	154	143	146	127	173	153	160
Autres accidents puerpéraux	Other puerperal accidents	1168	1189	1217	1152	1179	108	118	100	96	80	99	68	100	100	93	117	100
Débilité congénitale et vices de conformation	Congenital debility and malformation	16321	17032	16412	15792	15949	1570	1348	1440	1373	1231	1220	1341	1429	1192	1205	1221	1379
Sénilité	Senility	24315	23000	21708	21049	21507	2529	2109	2049	1979	1611	1481	1353	1431	1448	1367	1777	2373
Morts violentes	Violent deaths	6909	6757	6733	6176	6436	488	432	464	471	564	555	701	793	538	486	430	514
Suicide	Suicide	847	875	798	804	774	40	49	65	66	73	92	73	77	67	61	46	65
Autres maladies	Other diseases	90259	92944	87423	81747	82154	6889	6139	6336	6357	6065	6274	7489	9058	7259	6831	6588	6869
Maladies inconnues ou mal définies	Cause ill defined or unknown	13820	13599	12012	11775	11541	1139	891	946	996	974	856	1034	1071	895	896	917	926

* Chiffres provisoires. — Provisional figures.

ESTHONIE — ESTHONIA

(Population: 1 110 538. R. déc. 28, 1922)

Nombre de cas de maladie à déclaration obligatoire déclarés en Esthonie, 1919-1923; par mois en 1923.
Number of Cases of Notifiable Diseases reported in Esthonia, 1919-1923; by months in 1923.

Source: Conspectus Morborum contagiosorum in Republica Eesti, 1923; E. V. Tervishoiu peavalitsuse Arvanne, 1919, 1920, 1921, 1922

Maladie — Disease		Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec
Anthrax	Anthrax	3	3	1	0													
Botulisme	Botulism	0	0	0	0	8	1	1	0	0	1	0	0	0	0	3	1	1
Coqueluche	Whooping cough	436	232	215	1417	971	184	139	171	90	138	72	61	36	25	16	26	13
Dysenterie	Dysentery	3284	3459	1198	356	65	6	0	2	1	3	4	7	4	17	18	3	0
Diphtérie	Diphtheria	813	1207	825	517	411	69	31	38	52	47	16	25	25	24	16	29	39
Encéphalite leth.	Encephalitis leth.	—	—	9	0	12	2	3	4	3	0	0	0	0	0	0	0	0
Fièvre puerpérale	Puerperal fever	4	10	28	40	24	3	1	1	1	2	0	3	3	2	7	0	1
Fièvre récurrente	Relapsing fever	158	978	118	104	9	4	0	0	0	0	1	0	0	4	0	0	0
Fièvre typhoïde [1]	Enteric fever [1]	583	1150	1175	828	677	70	53	50	27	38	28	36	108	86	62	73	46
Lèpre	Leprosy	35	38	49	37	25	4	3	1	4	4	2	1	2	3	1	0	0
Méningite cérébro-spinale	Cerebro-spinal meningitis	2	9	12	14	22	6	8	2	0	1	0	0	2	2	0	1	0
Rage humaine	Rabies	10	5	5	2	2	0	1	0	0	0	0	0	0	0	1	0	0
Rougeole	Measles	1754	1032	1785	2811	2092	165	416	204	293	633	228	87	32	11	3	10	10
Scarlatine	Scarlet fever	2100	2549	1433	583	676	122	90	86	57	57	26	21	35	27	36	49	70
Trachome	Trachoma	182	186	492	467	525	40	54	59	38	60	28	19	26	42	80	43	36
Tuberculose	Tuberculosis	60	29	72	71	1525	216	123	151	149	132	95	117	111	113	108	96	114
Typhus exanth.	Typhus	1232	4125	356	247	42	2	7	7	8	1	0	0	0	0	2	0	15
Varicelle	Chickenpox			56	81	116	16	9	9	6	13	4	1	2	1	17	32	6
Variole	Smallpox	267	435	141	58	21	1	0	10	2	7	0	1	0	0	0	0	0
Gonorrhée	Gonorrhœa	—	—	2397	3122	2841	205	220	208	280	222	299	208	293	177	243	254	232
Syphilis *	Syphilis *	—	—	1371	1411	1045	103	87	116	89	73	125	90	79	64	71	83	65
Chancre mou	Ulcus molle	—	—	199	112	135	12	14	20	20	13	7	7	11	6	8	5	12

* Les rapports mensuels subdivisent les cas en catégories suivantes: lues ulcus durum, secondaire, récent, récurrent, tertiaire, latent, malin, congénital, tabes dorsalis, et paralysie progressive.
* The monthly reports subdivide cases into the following categories: lues ulcus durum, secondary, recent, recurrent, tertiary, latent, malignant, congenital, tabes dorsalis, progressive paralysis.

Pas de cas de choléra, peste ou de malléus, 1919-1923. Trichinose: 2 cas en 1921, 1 cas en 1922, pas de cas en 1919, 1920 et 1923.
No case of cholera, plague or glanders, 1919-1923. Trichinosis: 2 cases in 1921, 1 case in 1922, no case in 1919, 1920 and 1923.

[1] Y compris cas de fièvre paratyphoïde comme suit: 1919, 28; 1920, 56; 1921, 78: 1922, 110; 1923, 67.
[1] Including cases of paratyphoid fever as follows: 1919, 28; 1920, 56; 1921, 78: 1922, 110; 1923, 67.

ÉTAT LIBRE D'IRLANDE — IRISH FREE STATE

(Population: 3 165 000. E. 30 juin 1923.)

Nombre de décès causés par certaines maladies transmissibles déclarés en 1922-1923, par trimestres.
Number of Deaths caused by Certain Communicable Diseases reported in 1922-1923, by quarters.

Source: Rapport trimestriel des mariages, naissances et décès, 1er trimestre 1924.
Quarterly Return of Marriages, Births and Deaths, 1st quarter 1924.

Maladie — Disease		1922 Total	Trimestre — Quarter I	II	III	IV	1923 Total	Trimestre — Quarter I	II	III	IV
Coqueluche	Whoop.-cough	181	66	57	34	24	420	87	121	121	91
Diarrhée et entérite	Diarrhœal diseases	499	114	106	159	120	588	108	122	220	138
Diphtérie	Diphtheria	383	118	101	65	99	277	106	65	35	71
Dysenterie	Dysentery	17	2	12	1	2	12	2	5	4	1
Fièvre typhoïde	Enteric fever	79	24	19	19	17	110	31	26	22	31
Rougeole	Measles	439	116	187	85	51	155	50	55	31	19
Scarlatine	Scarlet fever	69	22	24	11	12	57	22	16	9	10
Tuberculose, toutes formes	Tuberculosis, all forms	4484	1288	1285	1016	895	4238	1161	1230	937	910
Typhus exanth.	Typhus	20	3	2	12	3	17	1	9	5	2

Variole: pas de décès en 1922-1923. — Smallpox: no deaths in 1922-1923.

FINLANDE — FINLAND

(Population: 3 435 249. E. 31 déc. 1922)

Nombre de cas de maladies à déclaration obligatoire déclarés en Finlande, 1919-1923; par périodes de quinze jours en 1923.
Number of Cases of Notifiable Diseases reported in Finland, 1919-1923; by half-months in 1923.

Source: Conspectus Morborum contagiosorum in Republica Finlandensi 1923.
Rapports spéciaux pour les années 1919, 1920, 1921, 1922. Special Reports for the years 1919-1922.

Année et quinzaine: Year and Half-Month.	Diphtérie Diphtheria	Dysenterie Dysentery	Encéphalite léthargique Encephalitis lethargica	Fièvre récurr. Relapsing fever	Fièvre typhoïde et paratyphoïde Enteric fever[1]	Poliomyélite aiguë Acute poliomyelitis	Scarlatine Scarlet fever	Typhus	Variole Smallpox
Total 1919	8851	573		137	2569	12	7395	124	1759
Total 1920	6330	573	239[2]	8	1499	19	1970	1	77
Total 1921	3941	394	1095	2	1356	15	1359	33	27
Total 1922	1941	209	46	1	1298	30	990	1[3]	91
Total 1923	1787	193	83	2	1654	47	1148	11	12
Janvier January 1-15	95	10	6	0	22	1	36	0	0
16-31	101	3	16	0	58	0	52	0	0
Février February 1-15	169	8	8	0	36	1	60	0	0
16-28	127	6	21	1	36	0	69	6	0
Mars March 1-15	91	0	6	0	58	2	68	1	0
16-31	83	25	6	0	58	1	64	0	0
Avril April 1-15	57	4	2	0	29	0	45	0	0
16-30	85	1	4	0	64	0	48	3	1
Mai May 1-15	63	5	0	0	60	0	35	0	1
16-31	85	3	1	0	49	1	42	0	0
Juin June 1-15	37	1	1	0	55	0	42	0	0
16-30	64	3	0	0	45	5	52	0	0
Juillet July 1-15	39	3	1	0	51	0	22	0	0
16-31	49	12	0	0	211	1	43	0	0
Août August 1-15	47	8	1	0	39	1	22	0	1
16-31	50	12	1	0	98	4	26	0	1
Septembre September 1-15	45	6	0	1	89	6	31	0	2
16-30	68	27	1	0	67	3	46	1	1
Octobre October 1-15	57	5	0	0	100	10	61	0	2
16-31	82	5	2	0	180	3	104	0	3
Novembre November 1-15	70	2	0	0	80	1	39	0	0
16-30	67	14	2	0	79	1	41	0	0
Décembre December 1-15	85	1	3	0	66	4	35	0	0
16-31	71	29	1	0	24	2	65	0	0

Pas de cas de choléra asiatique 1919, 1920, 1922, 1923; 2 cas en 1921 dans un navire anglais venant de Léninegrad.

No case of Asiatic cholera, 1919, 1920, 1922, 1923; 2 cases in 1921 on board an English vessel coming from Leningrad.

Anthrax: pas de cas 1919, 1920, 1922, 1923; 2 cas en 1921. — Anthrax: no case in 1919, 1920, 1922, 1923; 2 cases in 1921.

[1] Jusqu'au 15 juillet 1923, la fièvre typhoïde et la fièvre paratyphoïde étaient données ensemble; depuis cette date elles sont données séparément. Le total pour 1923 comprend 622 cas de fièvre paratyphoïde pour la période du 16 juillet au 31 décembre.

[1] Up to July 15th, 1923, typhoid and paratyphoid fever were reported together, since this date separately. The total for 1923 includes 622 cases of paratyphoid fever for the period July 16th to December 31st.

[2] Pour le mois de décembre 1920. La déclaration n'était pas obligatoire avant le mois de décembre.

[2] For the month of December 1920. Notification was not obligatory before December 1920.

[3] Courrier de la Russie. — [3] A courier from Russia.

FRANCE

(Population: 39.400.000. E. 30 juin 1922)

Nombre de cas de maladies à déclaration obligatoire déclarés en France; par mois en 1923.
Number of Cases of Notifiable Diseases reported in France, by months, in 1923.

Source: Rapport du Ministère de l'Hygiène. — Report from Ministry of Health.

Maladie — Disease		Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Juin June	Juillet July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Entérite cholériforme	Cholera nostras	24	24	99	32	21	0	1	0	1	1	4	3	5	2	2	0	2
Dysenterie	Dysentery	800	381	1852	167	239	5	2	5	0	4	7	28	71	57	41	10	9
Diphtérie	Diphtheria	10009	14598	16981	12624	11033	1144	1118	1166	946	1259	1026	846	588	497	647	830	966
Fièvre puerpérale	Puerperal fever	165	492	436	168	202	18	13	18	14	24	14	19	18	13	17	13	21
Fièvre typh.	Enteric fever	4961	7673	8116	4787	6297	328	351	425	653	455	375	438	532	690	692	691	667
Méningite cérébro-spinale	Cerebro-spinal meningitis	490	417	398	379	381	34	47	9	51	30	41	29	37	22	30	18	33
Ophtalmie d. nouveau-nés	Ophthalmia of new-born	21	53	44	31	23	3	2	2	3	1	2	0	0	1	5	0	4
Peste	Plague	1	9	0	3	14	1	1	0	0	0	12	0	0	0	0	0	0
Poliomyélite	Poliomyelitis	194	134	211	165	175	14	9	14	13	17	14	18	16	17	8	23	12
Rougeole	Measles	14002	17489	16644	12019	34585	3751	5124	5668	4438	5308	4295	2862	986	399	552	569	633
Scarlatine	Scarlet fever	11056	16839	13667	7435	5254	551	468	554	495	560	585	362	276	183	335	404	481
Suette miliaire	Miliary fever	35	57	433	63	23	2	1	0	3	3	0	1	0	1	11	0	1
Typhus exant.	Typhus	182	23	17	15	8	0	0	2	0	0	0	0	0	4	0	2	0
Variole	Smallpox	572	392	341	172	195	42	21	12	11	16	34	24	16	5	4	6	4

Pas de cas de fièvre jaune ou de choléra asiatique, 1919–1923. — No cases of yellow fever or Asiatic cholera, 1919–1923.

GRÈCE — GREECE

Nombre de cas du typhus exanthématique et de la variole constatés en 1923, par mois.
Number of Cases of Typhus and Smallpox reported in 1923, by months.

Source: Rapport d'ensemble relatif a la Campagne de vaccination exécutée en Grèce (Société des Nations, C. H. 149).
Rapports du Ministère de l'Hygiène. — Reports from the Ministry of Health.

Maladie — Disease		Total	Jan. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Juin June	Juill. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Typhus exanthématique	Typhus	7607	1210	1520	2080	1138	896	411	205	47	26	26	15	33
Variole	Smallpox	2116	325	280	260	336	406	229	119	48	37	11	21	44

HONGRIE — HUNGARY

(Population: 8 158 590. E. 31 décembre 1923)

ombre de cas de maladies à déclaration obligatoire et de décès dus à ces maladies déclarés en Hongrie, 1921-1923; par périodes de quinze jours en 1923.
Number of Cases of and Deaths from Notifiable Diseases reported in Hungary in 1921-1923; by half-months in 1923.

ource: Rapports sur les Maladies épidémiques.

Quinzaine Half-month	Coqueluche Whooping cough		Diphtérie Diphtheria		Dysenterie Dysentery		Fièvre typhoïde et paratyph. Enteric fever		Méningite céréb.-spin. Cereb.-spin. meningitis		Oreillons Mumps		Rougeole Measles		Scarlatine Scarlet fever		Septicémie puerpérale Puerperal fever		Typhus exanthém. Typhus		Variole Smallpox	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
Total 1921	2656	137	3781	337	5230	485	6880	612	35	16	1844	2	51172	1070	21664	2866	161	51	73	8	131	25
Total 1922	2669	127	2656	293	2455	332	5477	665	49	11	1631	5	7465	388	13243	2038	123	50	17	3	2	0
Total 1923	2736	227	2635	276	4321	694	4880	669	29	11	3915	7	16413	386	6386	687	145	59	385	45	9	4
Janv.-Jan. 15	122	3	165	12	18	4	195	9	0	0	114	0	310	14	557	44	5	1	0	0	0	0
31	86	5	172	32	20	4	105	16	0	0	199	1	385	13	331	57	11	6	9	2	0	0
Févr.-Febr. 15	96	6	121	21	20	1	92	12	1	0	247	1	300	8	274	38	4	2	43	0	1	1
28	92	11	139	13	15	2	75	18	0	0	266	1	408	13	192	35	5	1	56	7	0	0
Mars-March 15	106	7	139	6	15	3	63	13	0	0	342	0	521	6	198	24	6	4	37	5	0	0
31	106	7	129	17	18	1	73	14	2	1	263	0	499	14	191	41	8	2	39	5	7	2
Avril-April 15	85	4	141	11	32	3	73	11	1	0	397	0	821	27	167	19	2	0	38	2	0	0
30	103	10	133	12	27	5	73	12	1	0	305	1	1207	47	184	18	2	1	23	6	0	0
Mai-May 15	111	15	120	15	15	3	71	4	3	0	379	0	1478	25	221	23	3	3	51	8	0	0
31	138	16	93	13	18	4	46	10	3	2	433	0	1630	20	181	22	7	5	49	8	0	0
Juin-June 15	119	14	93	6	72	0	57	9	3	2	187	0	1460	22	162	22	2	1	6	1	0	0
30	178	15	64	6	97	19	61	6	1	1	116	0	1191	14	166	15	5	3	4	1	0	0
Juil.-July 15	175	10	57	7	85	17	85	9	1	0	58	0	941	22	134	17	4	1	6	0	0	0
31	179	9	44	4	113	20	136	17	3	0	35	0	610	21	113	11	5	4	6	0	0	0
Août-Aug. 15	75	20	55	3	238	21	146	14	1	1	15	0	217	19	119	16	6	1	0	0	0	0
31	192	11	63	6	540	75	333	34	2	2	16	0	175	12	178	25	10	6	12	0	0	0
Sept.-Sept. 15	161	15	80	6	652	107	371	34	1	0	13	1	100	2	208	28	5	1	2	0	0	0
30	156	12	81	7	632	97	475	63	4	1	11	0	203	9	287	24	9	4	0	0	1	1
Oct.-Oct. 15	55	9	94	3	511	90	504	59	0	0	54	0	259	7	340	27	8	0	2	0	0	0
31	64	4	142	15	417	85	556	82	1	1	70	0	481	7	500	47	9	6	2	0	0	0
Nov.-Nov. 15	52	8	120	12	366	45	417	53	0	0	45	0	651	11	514	33	8	2	0	0	0	0
30	103	7	136	15	213	54	372	63	1	0	147	1	768	15	446	37	6	2	0	0	0	0
Déc.-Dec. 15	110	6	131	15	92	17	287	62	0	0	132	1	897	20	387	33	10	0	0	0	0	0
31	72	3	123	19	95	17	214	45	0	0	71	0	901	18	336	31	5	3	0	0	0	0

Poliomyélite: 1921, 14 cas et 1 décès; 1922, 3 cas et 1 décès; 1923, 2 cas et 1 décès.
Poliomyelitis: 1921, 14 cases and 1 death; 1922, 3 cases and 1 death; 1923, 2 cases and 1 death.

Pas de cas de choléra asiatique, de fièvre récurrente ou de peste, 1921-1923.
No case of Asiatic cholera, relapsing fever or plague, 1921-1923.

IRLANDE DU NORD — NORTHERN IRELAND

(Population: 1 282 000. E. juin 1923)

Nombre de cas de maladies à déclaration obligatoire déclarés en Irlande du Nord en 1923 et de décès causés par ces maladies, 1919-1923
Number of Cases of Notifiable Diseases reported in Northern Ireland in 1923 and Deaths due to these Diseases, 1919-1923.

Source: Rapports trimestriels en 1923; Premier rapport annuel du Registrar-General, 1922.
Quarterly Returns, 1923; First Annual Report of the Registrar-General, 1922.

Maladie — Disease		Cas — Cases					Décès — Deaths				
		Total 1923	Trimestre — Quarter				1919	1920	1921	1922	1923
			I	II	III	IV					
Coqueluche	Whooping-cough	2	2	0	0	0	158	185	366	194	289
Diphtérie	Diphtheria	925	326	229	165	205	68	141	143	135	99
Encéphalite léthargique	Encephalitis lethargica	23	6	12	4	1	—	26	19	5	—
Erysipèle	Erysipelas	190	66	31	25	68	—	—	—	18	—
Fièvre continue	Continued fever	2	0	1	1	0	—	—	—	—	—
Fièvre puerpér.	Puerperal fever	22	6	3	5	8	44	116	64	56	—
Fièvre typhoïde et paratyph.	Enteric fever	168	27	24	62	55	57	65	37	26	21
Grippe	Influenza	25	0	0	0	25	1938	560	316	889	298
Méningite cérébro-spin.	Cerebro-spinal meningitis	4	1	0	3	0	15	9	10	6	—
Ophtalmie des nouveau-nés	Ophthalmia neonatorum	11	4	2	3	2	—	—	—	—	—
Paludisme	Malaria	3	0	0	1	2	—	—	—	—	—
Pneumonie*	Pneumonia*	303	73	116	42	72	1644	1508	1199	1402	—
Poliomyélite aiguë	Acute poliomyelitis	2	1	0	1	0	—	—	—	4	—
Rougeole	Measles	142	13	38	42	49	158	278	44	52	199
Scarlatine	Scarlet fever	1622	408	358	338	518	199	206	51	46	50
Tuberculose	Tuberculosis	—	—	—	—	—	2804	2529	2244	2107	1983
Typhus exanth.	Typhus	6	0	5	1	0	10	12	2	1	3
Varicelle	Chickenpox	30	0	0	4	26	—	—	—	—	—
Variole	Smallpox	0	0	0	0	0	0	1	0	0	0

* Tous les cas de pneumonie ne sont pas notifiés. — All cases of pneumonia are not notified.

ITALIE — ITALY

(Population: 37 276 738. R. Décembre 1, 1921)

Nombre de cas de maladies à déclaration obligatoire déclarés en Italie, 1919-1923; par semaines en 1923.
Number of Notifiable Diseases reported in Italy, 1919-1923; by weeks in 1923.

Source: Bolletino delle Malattie infective nel Regno, Roma. Bollettino Sanitario del Ministero dell' Interno. (Juin — June 1923.)

Semaine finissant Week ended	Diphtérie Diphtheria	Dysentérie Dysentery	Encéphalite léthargique Encephalitis lethargica	Fièvre typhoïde et paratyphoïde Enteric fev.	Méningite cérébro-sp. Cerebro-sp. meningitis	Rougeole Measles	Scarlatine Scarlet fev.	Variole Smallpox
Total 1919	11103	4973	—	23400	266	56401	6690	34365
Total 1920	12619	2666	—	32487	110	94223	10209	26453
Total 1921	12081	2201	278	35527	86	96725	11079	4644
Total 1922	11347	1197	477	25316	66	46471	11965	534
Total 1923	11183	1118	277	27626	368	75024	13418	495
Janvier — January 7	189	1		151	0	649	196	0
14	206	0	15	171	0	515	182	10
21	160	1		160	1	501	162	0
28	196	0		148	0	704	199	1
Février — February 4	185	1		121	3	646	165	0
11	166	0	35	90	14	863	176	0
18	207	0		176	12	842	174	11
25	188	0		111	6	756	151	9
Mars — March 4	233	0		132	9	1401	206	9
11	191	0		118	14	1102	139	3
18	181	3	70	106	15	1431	174	7
25	148	0		103	10	998	114	7
Avril — April 1	214	0		156	20	1442	152	6
8	196	1		119	3	1325	200	1
15	188	2	45	134	15	1233	185	6
22	189	1		102	14	1433	229	4
29	182	0		112	9	1678	203	7
Mai — May 6	139	0		109	5	1326	170	7
13	213	0		208	13	1681	232	5
20	193	1	27	193	19	1607	212	10
27	163	1		176	6	1259	214	11
Juin — June 3	187	2		218	10	1317	198	4
10	202	6	15	225	14	1476	282	8
17	153	14		254	4	1154	229	5
24	158	16	5	223	10	2071	327	5
Juillet — July 1	113	6	1	247	5	1126	220	11
8	156	8	0	315	8	1568	324	6
15	135	25	2	425	4	1341	302	10
22	109	16	0	372	4	803	216	7
29	161	14	1	537	5	1378	321	7
Août — August 5	174	45	1	570	3	1115	275	11
12	176	57	4	911	16	1432	286	8
19	124	48	1	849	5	445	247	3
26	208	108	1	1283	6	675	337	9
Septembre-September 2	181	73	1	1003	4	609	267	4
9	147	33	1	974	1	330	186	0
16	270	88	1	1284	11	625	319	0
23	224	112	2	1127	6	263	233	0
30	186	115	1	1122	3	381	262	3
Octobre — October 7	258	77	3	1283	3	413	386	0
14	264	59	4	1129	6	290	375	3
21	316	37	5	1050	6	337	404	0
28	221	19	1	757	4	342	313	4
Novembre - November 4	256	23	5	841	5	535	501	3
11	360	11	6	902	6	675	446	3
18	322	43	4	892	4	979	414	3
25	295	18	4	715	2	901	418	5
Décembre - December 2	289	10	1	722	6	1148	426	5
9	365	7	5	700	6	1356	299	6
16	338	9	1	633	3	976	492	5
23	300	4	3	365	4	1387	214	0
30	347	3	6	492	6	1131	328	1

Autres maladies notifiées: — Other diseases declared:

	Anthrax Anthrax	Paludisme Malaria	Pellagre Pellagra	Peste Plague	Rage humaine Rabies	Typhus exanthém. Typhus
1919	1498	247084	399	0	44	6051*
1920	1712	227747	256	0	39	113
1921	1295	267589	194	19	57	60
1922	2029	234656	303	22	82	0
1923	2205	188937	66	1	113	1

* Dont 5416 cas parmi les prisonniers de gueerre. — Of these, 5416 cases were among prisoners of war.

Pas de cas de choléra asiatique ou de fièvre jaune 1919-1923. — No case of Asiatic cholera or yellow fever 1919-1923.

LETTONIE — LATVIA

(Population: 1 950 000. E. 31 décembre 1922)

Nombre de cas de maladies à déclaration obligatoire déclarés en Lettonie, 1919-1923; par mois en 1923.
Number of Cases of Notifiable Diseases reported in Latvia, 1919-1923; by months in 1923.

Source: Conspectus Morborum Contagiosorum in Republica Latviensi.

Maladie / Disease		Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept Sept	Oct. Oct.	Nov. Nov.	Déc. Dec.
Anthrax	Anthrax		0	9	7	2	0	0	0	1	0	0	0	0	0	0	0	1
Coqueluche	Whooping cough		604	449	510	479	19	50	52	38	58	71	65	38	28	22	22	16
Diphtérie	Diphtheria		1159	964	698	645	44	55	56	71	70	55	62	48	47	50	47	40
Dysenterie	Dysentery		5479	1162	913	114	9	10	3	5	4	8	23	26	14	10	1	1
Encéph. léthar.	Enceph. lethar.			6	4	0												
Erysipèle	Erysipelas		13	21	23	23	0	0	1	2	4	5	2	4	0	3	2	0
Fièvre puerper.	Puerperal fever		18	18	23	22	2	7	2	1	0	3	0	1	1	1	0	4
Fièvre récurr.	Relapsing fever		547	275	116	10	3	1	1	0	0	0	1	0	1	3	0	0
Fièvre typhoïde	Enteric fever		1615	1431	1011	1043	81	81	72	78	67	80	76	127	101	113	78	89
Grippe	Influenza		258	14	226	234	7	102	45	21	8	4	1	1	7	12	8	18
Lèpre	Leprosy		30	28	24	37	3	1	4	3	7	8	0	5	3	1	2	0
Méningite céré-bro-spinale	Cerebro-spinal meningitis		88	31	22	19	3	2	6	0	0	3	0	0	3	0	1	1
Oreillons	Mumps		407	315	311	817	33	25	64	146	281	207	7	1	5	7	26	15
Paludisme	Malaria		57	192	66	50	1	1	2	3	8	7	6	2	0	5	0	0
Pneumonie	Pneumonia		19	9	16	20	4	5	7	4	0	0	0	0	0	0	0	0
Rage humaine	Rabies		10	20	15	21	1	3	1	3	4	1	0	0	4	1	2	1
Rougeole	Measles		1036	3062	715	315	16	62	34	49	29	35	5	11	2	14	20	38
Scarlatine	Scarlet fever		2572	1532	1598	1555	156	133	142	158	167	147	89	92	84	106	125	156
Tetanos	Tetanus		0	3	2	0												
Trachome	Trachoma			0	0	2	2	0	0	0	0	0	0	0	0	0	0	0
Typhus exanth.	Typhus		4631	1288	1480	430	34	37	56	96	90	45	22	19	9	12	1	9
Varicelle	Chickenpox		19	32	70	55	6	17	10	5	14	2	0	1	0	0	0	0
Variole	Smallpox		422	255	160	23	2	0	5	4	5	0	0	1	0	3	1	2

Autres maladies notifiées: 1 cas de choléra asiatique en 1920 et 1 cas en 1921; 2 cas de scorbut en 1922. Pas de cas de peste, 1920-1923.
Other diseases declared: 1 case of Asiatic cholera in 1920 and 1 case in 1921; 2 cases of scurvy in 1922. No case of plague, 1920-1923.

LITHUANIE — LITHUANIA

(Population: 2 035 121. E. 31 déc. 1923.)

Nombre de cas de maladies à déclaration obligatoire et de décès causés par ces maladies déclarés en Lithuanie, 1920-1923; par mois en 1923.

Cases of and Deaths from Notifiable Diseases reported in Lithuania, 1920-1923; by months in 1923.

Source: Rapports du Département de la Santé publique, 1920-1922; rapport spécial du Bureau central de Statistique de la Lithuanie, 1923.

Reports from the Department of Public Health, 1920-1922; Special Report from the Central Office of Statistics of Lithuania, 1923.

Maladie — Disease			Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Anthrax	Anthrax	C.	—	—	3	14	0	0	0	0	0	0	2	4	1	3	4	0
		D.	—	—	0	3	0	0	0	0	0	2	1	0	0	0	0	0
Coqueluche	Whooping-cough	C.	—	—	—	1131	56	89	52	58	127	191	153	154	85	58	60	48
		D.	—	—	—	11	0	0	0	0	3	0	3	2	0	2	1	0
Diphtérie	Diphtheria	C.	—	—	292	228	14	8	19	30	31	21	10	10	19	26	22	18
		D.	—	—	15	12	1	0	2	4	0	1	0	0	0	1	2	1
Dysentarie	Dysentery	C.	4435	1163	356	184	0	3	1	4	6	3	28	58	37	27	8	9
		D.	500	123	12	15	0	0	0	0	0	0	1	7	2	3	1	1
Encéphalite léthargique	Encephalitis lethargica	C.	—	—	—	72	0	12	30	21	9	0	0	0	0	0	0	0
		D.	—	—	—	8	0	0	7	0	1	0	0	0	0	0	0	0
Erysipèle	Erysipelas	C.	—	—	—	345	26	23	23	21	32	43	36	31	32	29	25	24
		D.	—	—	—	1	0	0	0	0	0	0	0	1	0	0	0	0
Fièvre puerpérale	Puerperal fever	C.	—	—	—	180	16	14	18	17	15	16	18	14	12	14	21	5
		D.	—	—	—	11	0	2	1	0	0	1	0	1	1	3	1	1
Fièvre récurrente	Relapsing fever	C.	732	1031	910	13	2	6	1	1	0	2	0	0	0	0	1	0
		D.	32	19	24	0	0	0	0	0	0	0	0	0	0	0	0	0
Fièvre typhoïde et paratyph.	Enteric fever	C.	2421	1277	1140	799	74	66	67	44	35	76	72	87	90	70	46	72
		D.	115	52	33	34	5	4	3	2	2	1	1	3	1	6	2	4
*Gale	*Scabies	C.	—	—	—	1803	145	137	177	171	187	178	142	127	150	140	145	104
Grippe	Influenza	C.	—	—	—	3504	370	424	409	378	312	236	219	170	209	247	247	283
		D.	—	—	—	2	2	0	0	0	0	0	0	0	0	0	0	0
Méningite cérébro-spinale	Cerebro-spinal meningitis	C.	—	—	20	13	2	0	1	4	0	2	0	1	0	3	0	0
		D.	—	—	5	3	0	0	1	1	0	0	0	1	0	0	0	0
*Oreillons	*Mumps	C.	—	—	—	88	1	1	2	3	22	7	4	8	1	3	18	18
*Paludisme	*Malaria	C.	—	—	—	105	6	4	5	5	10	36	11	2	9	12	4	1
Rougeole	Measles	C.	—	—	—	374	0	11	15	0	3	9	5	7	4	6	201	113
		D.	—	—	—	7	0	0	0	0	0	0	0	1	0	0	3	3
Scarlatine	Scarlet fever	C.	—	—	437	230	22	21	12	27	23	20	16	12	12	24	19	22
		D.	—	—	26	11	1	0	0	1	2	0	1	3	0	1	1	1
*Trachome	*Trachoma	C.	—	—	—	1764	124	152	174	162	181	168	182	158	128	133	121	81
Tuberculose	Tuberculosis	C.	—	—	—	3653	224	324	327	375	361	444	378	266	228	365	189	172
		D.	—	—	—	70	2	8	5	7	7	5	4	5	2	13	6	6
Typhus exanth.	Typhus	C.	5302	3004	3409	830	202	131	98	103	119	54	20	30	6	1	32	34
		D.	431	167	226	60	14	10	6	8	10	3	3	3	0	0	0	3
*Varicelle	*Chickenpox	C.	—	—	—	36	2	5	2	1	6	3	4	0	0	1	8	4
Variole	Smallpox	C.	1213	1035	345	25	0	1	0	2	2	2	5	1	5	0	3	4
		D.	196	121	30	0	0	0	0	0	0	0	0	0	0	0	0	0
*Chancre mou	*Soft chancre	C.	—	—	—	99	3	4	5	4	2	1	15	4	10	31	16	4
*Gonorrhée	*Gonorrhœa	C.	—	—	—	577	27	24	35	30	29	49	75	32	75	75	76	50
*Syphilis	*Syphilis	C.	—	—	—	580	28	23	51	21	40	30	57	35	63	72	88	72

35 cas et 11 décès de choléra asiatique en 1921; pas de cas ou de décès en 1920, 1922 et 1923
35 cases of and 11 deaths from asiatic cholera in 1921; no case or death in 1920, 1922 and 1923.

2 cas de botulisme et 1 cas de lèpre en 1923, pas de décès. — 2 cases of botulism and 1 case of leprosy in 1923, no death.

Pas de cas ou de décès de peste, 1920-1923. — No case of or death from plague, 1920-1923.

* Pas de décès en 1923. — No death in 1923.

NORVÈGE (villes) — NORWAY (Towns)

(Population: 785 500. E. 1921)

Nombres de cas de maladies à déclaration obligatoire et de décès dus à ces maladies déclarés dans les villes de Norvège, 1919-1923; par mois en 1923.

Number of Cases of and Deaths from Notifiable Diseases reported in the Towns of Norway, 1919-1923; by months in 1923.

Source: Rapport spécial pour les années 1919-1923. Special Report for the years 1919-1923.

Maladie — Disease			Total 1919*	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fev. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Angine	Tonsilllitis	C.	21091	13783	10559	11489	11205	1074	907	998	1254	920	1178	629	640	686	993	999	927
		D.	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Bronchite aiguë	Ac. bronchitis	C.	60170	66133	54744	57387	49289	6928	5874	4694	4006	3451	2804	1983	1925	2541	3708	5172	6223
		D.	137	182	116	163	140	20	22	19	19	9	5	4	7	7	7	5	16
Choléra nostras	Cholera nostras	C.	13544	9889	11265	9814	7137	578	450	479	492	455	515	721	855	683	703	598	608
		D.	77	83	73	74	44	2	2	7	3	3	3	3	1	10	3	4	3
Coqueluche	Whooping cough	C.	4119	6116	2137	6185	4580	901	654	571	425	334	250	194	292	181	243	291	244
		D.	32	53	31	80	38	4	14	5	4	3	2	2	0	0	1	3	0
Diphtérie	Diphtheria	C.	8365	3582	1952	850	826	64	63	57	59	43	53	43	55	78	104	103	104
		D.	268	112	50	30	32	4	0	2	3	2	2	2	3	5	3	3	3
Dysenterie	Dysentery	C.	60	237	168	92	24	1	1	3	4	10	2	1	2	0	0	0	0
		D.	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Encéphalite léth.	Encephalitis l.	C.	11	38	55	7	10	2	2	2	3	0	0	0	0	0	0	0	0
		D.	3	9	13	3	1	0	0	1	0	0	0	0	0	0	0	0	0
Erysipèle	Erysipelas	C.	1478	892	742	729	815	67	59	83	90	80	65	55	49	67	70	60	70
		D.	37	19	17	10	20	1	1	5	0	2	4	0	2	0	2	0	3
Fièvre typhoïde	Enteric fever	C.	856	394	601	221	170	15	10	10	10	9	17	22	19	13	17	13	15
		D.	31	22	23	16	13	0	1	1	0	1	0	0	3	1	1	3	2
Grippe	Influenza	C.	25920	15980	5419	51747	23784	5382	9058	5144	945	371	235	163	137	229	337	643	1140
		D.	557	105	10	187	131	23	41	46	9	7	1	0	1	0	0	2	1
Méningite cérébro-spinale	Cerebro-spinal meningitis	C.	14	16	15	6	12	0	1	2	1	0	0	1	2	0	1	2	2
		D.	4	8	7	4	7	0	1	2	1	0	1	1	0	0	0	0	1
Oreillons	Mumps	C.	237	1222	3569	721	531	22	25	47	31	39	34	36	25	45	47	68	112
		D.	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paludisme*	Malaria*	C.	15	11	10	11	12	0	0	0	2	0	1	2	1	3	3	0	0
Pemphigus des nouveau-nés	Pemphigus of newborn	C.	35	48	62	31	45	2	5	5	7	2	2	4	6	3	0	5	4
		D.	7	3	2	3	1	0	0	0	0	0	0	0	0	0	0	0	1
Pleurésie	Pleurisy	C.	1912	1943	1800	1871	1828	176	148	185	158	163	176	125	129	112	141	148	167
		D.	7	5	3	9	12	0	0	3	0	0	1	1	1	1	5	0	0
Pneumonie croupale	Croupous pneumonia	C.	4230	3035	2188	2684	2311	268	290	271	224	195	116	80	70	103	155	218	321
		D.	560	501	320	342	348	32	48	47	33	34	25	15	9	19	16	26	44
Poliomyélite aiguë	Acute poliom.	C.	35	24	3	5	19	0	1	1	2	1	1	0	2	7	2	0	2
		D.	0	2	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0
Rhumatisme articulaire	Rheumatic fever	C.	1339	1229	889	1076	1281	129	76	132	160	108	132	116	85	52	102	95	94
		D	19	11	11	11	13	0	0	4	1	0	1	0	2	1	0	3	1
Rougeole	Measles	C.	1444	5936	5649	3647	2150	105	255	302	238	154	181	98	50	71	134	290	272
		D.	8	25	29	27	10	1	1	1	2	2	1	0	0	2	0	0	0
Rubeole*	Rubeola*	C.	490	350	181	139	553	41	40	51	86	83	101	30	21	18	17	18	47
Scarlatine	Scarlet fever	C.	1077	889	483	913	1108	132	77	98	82	118	107	66	46	60	99	113	110
		D.	11	15	0	6	4	0	0	0	1	1	1	0	0	0	0	0	1
Scorbut**	Scurvy**	C.	10	0	1	4	2	0	0	0	0	0	0	0	1	1	0	0	0
Septicémie puerp.	Puerper. fever	C.	54	62	44	26	34	1	3	4	3	5	3	3	3	1	4	2	2
		D.	19	8	8	11	11	1	2	1	1	0	2	0	3	0	1	0	0
Septicémie pyémie	Septicæmia pyæmia	C.	117	127	111	99	83	7	5	10	18	2	4	8	5	5	4	6	9
		D.	54	54	45	45	36	2	1	5	5	3	2	5	3	2	2	3	3
Varicelle	Chickenpox	C.	1580	1609	2073	1575	1409	194	93	89	83	63	85	61	50	105	131	197	258
		D.	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Gonorrhée*	Gonorrhœa*	C.	5114	4749	4245	3979	3655	305	257	244	322	397	357	302	320	315	324	301	211
Chancre mou*	Soft chancre*	C.	607	526	487	427	278	24	33	20	22	28	27	20	25	22	29	17	11
Syphilis	Syphilis	C.	1814	1501	1285	1138	906	91	84	45	88	91	72	85	86	63	78	74	49
		D.	14	13	8	10	13	3	0	0	2	1	1	2	0	0	1	1	2

* Pas de décès 1919-1923. — No death 1919-1923.

** Le scorbut a causé 8 décès en 1919; pas de décès en 1920-1923. ** 8 deaths from scurvy in 1919, no deaths in 1920–1923.

Choléra asiatique: pas de cas 1919-1923; Typhus exanthématique: 1 cas en 1920. 2 cas, 2 décès en 1922, pas de cas en 1919, 1921 et 1923; variole: 1 cas en 1921, pas de cas en 1919-1920, 1922-1923.

Asiatic cholera: no case 1919-1923: Typhus: 1 case in 1920, 2 cases, 2 deaths in 1922, no case in 1919,1921 and 1923; Smallpox: 1 case in 1921, no case in 1919-1920, 1922-1923.

PAYS-BAS — NETHERLANDS

(Population: 7 086 913. E. 31 déc. 1922)

Nombre de cas de maladies à déclaration obligatoire et de décès dus à ces maladies déclarés dans les Pays-Bas, 1919-1923; par mois en 1923

Number of Cases of and Deaths from Notifiable Diseases reported in the Netherlands, 1919-1923; by months in 1923.

Source: Verslagen en Mededeelingen betreffende de Volksgezondheid.

Maladie — Disease			Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Diphtérie	Diphtheria	C.	10900	8091	7575	4740	4134	459	410	381	350	340	325	340	273	270	320	300	366
		D.	745	452	375	309	231	28	32	19	24	18	9	20	12	10	19	17	23
Dysenterie	Dysentery	C.	16	11	20	14	7	0	0	0	1	2	1	0	0	0	3	0	0
		D.	5	3	9	11	4	0	0	0	0	0	1	0	1	1	0	1	0
Fièvre typhoïde	Enteric fever	C.	4382	2223	2004	1132	1391	86	100	95	92	108	81	107	187	113	164	143	115
		D.	541	308	282	133	175	17	10	17	12	21	15	15	13	12	14	14	15
Méningite cérébro-spinale	Cerebro-spinal meningitis	C.	122	133	120	132	111	10	10	10	13	4	11	7	11	5	11	10	9
		D.	53	71	61	69	66	7	6	2	12	2	7	5	2	5	5	5	8
Poliomyélite	Poliomyelitis	C.					6*									0	1	4	1
		D.					0*									0	0	0	0
Scarlatine	Scarlet fever	C.	16721	6208	4045	3301	3580	359	269	274	208	312	280	218	227	309	405	364	355
		D.	348	129	58	35	28	4	0	2	3	2	3	2	2	3	1	1	5
Typhus exanth.	Typhus	C.	758	3	8	1	14	2	3	3	2	2	0	0	0	2	0	0	0
		D.	65	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Variole	Smallpox	C.	5	50	1	0	2	0	0	0	0	1	1	0	0	0	0	0	0
		D.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* La déclaration de poliomyélite et d'encéphalite léthargique est obligatoire depuis le 21 septembre 1923.
Notification of acute poliomyelitis and encephalitis lethargica has been obligatory since September 21st, 1923.
Pas de cas de choléra asiatique ou de peste, 1919-1923.
No case of Asiatic cholera or plague, 1919-1923.

POLOGNE — POLAND

(Population: 27 160 163. R. 1921)

Nombre de cas de maladies à déclaration obligatoire et de décès dus à ces maladies déclarés en Pologne, 1920-1923; par semaines en 1923
Number of Cases of and Deaths from Notifiable Diseases reported in Poland, 1920-1923: by weeks in 1923.

Source: Rapport spécial du Ministère de la Santé publique. Special Report from Ministry of Health.

Année et semaine finissant: Year and Week ended:	Coqueluche Whooping cough		Diphtérie Diphtheria		Dysenterie Dysentery		Encéphalite léthargique Encephalitis lethargica		Erysipèle Erysipelas		Fièvre puerpérale Puerperal fever		Fièvre récurrente Relapsing fever		Fièvre typhoïde et para-typhoïde Enteric fev.		Paludisme Malaria		Méningite Meningitis		Rage humaine Rabies	Rougeole Measles		Scarlatine Scarlet fev.		Trachome Trachoma	Tuberculose Tuberculosis		Typhus exanthém. Typhus		Variole Smallpox	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	D.	C.	D.	C.	D.	C.	C.	D.	C.	D.	C.	D.
Total 1919	1126	167	1815	219	7734	1226	—	—	425	76	341	111	3266	149	11421	1046	1513	13	330	101	1	6933	464	4690	547	1570	141	10781	219088	18641	1864	264
Total 1920	3674	300	3178	387	31020	5168	—	—	835	115	508	196	7188	293	21466	1972	2073	25	596	226	19	10831	405	16664	2256	1556	1746	7944	168097	22575	3948	687
Total 1921	4356	301	4130	544	32944	4988	85	43	1331	118	539	222	13850	414	30067	2384	52965	41	477	281	22	23143	782	28164	3924	2425	4235	8452	49547	4199	5078	823
Total 1922	8219	446	4228	414	14344	1739	121	27	1644	107	609	233	41207	1461	22056	1641	17611	13	533	269	34	23830	792	14717	1945	2737	5168	9227	42724	3199	2399	519
Total 1923	4367	462	3694	426	5314	853	329	59	1483	77	682	252	2067	44	14037	1284	4770	4	597	332	36	22159	689	15746	1711	4061	5725	10137	11185	898	502	83
Janv.—Jan. 6	104	16	68	9	12	1	6	0	30	3	17	9	124	1	283	20	53	1	19	9	0	562	33	239	20	51	90	154	295	25	15	1
13	108	11	71	10	25	4	3	0	27	2	11	6	139	4	322	25	43	0	15	8	1	621	24	278	25	53	84	224	381	26	8	2
20	125	13	65	12	28	0	13	2	33	1	8	6	129	2	313	35	55	0	13	7	0	452	29	315	54	51	156	194	377	43	29	3
27	95	10	67	10	11	3	11	0	31	3	12	6	116	3	272	30	63	0	17	6	2	657	22	349	32	34	103	219	389	41	20	1
Fév. — Feb. 3	67	14	62	5	16	5	26	3	22	5	10	2	102	0	234	19	36	0	10	4	0	616	30	213	31	48	96	216	407	27	9	5
10	62	12	85	11	25	1	12	4	21	1	16	5	117	6	278	27	20	0	14	7	0	1323	30	225	55	91	126	229	501	34	9	4
17	174	20	74	10	17	5	21	2	19	0	20	7	95	4	239	14	37	0	12	8	0	1299	28	232	37	26	109	199	324	32	15	3
24	99	10	87	12	19	1	18	2	23	1	17	6	101	2	299	29	38	0	12	12	0	1265	27	241	38	59	150	230	468	33	7	0
Mars—March 3	66	5	68	11	17	3	11	2	23	0	16	6	119	5	238	23	43	0	27	6	0	835	32	221	32	146	156	236	449	25	5	3
10	64	11	71	5	15	0	25	5	21	1	13	3	84	2	274	28	52	0	12	10	0	611	22	215	28	77	119	287	548	41	10	1
17	81	16	70	13	9	2	19	4	23	1	21	2	60	1	212	17	63	0	18	13	1	697	21	220	42	87	141	214	501	30	19	1
24	65	5	41	9	21	3	16	3	29	0	18	5	68	1	209	24	74	0	10	6	0	546	15	218	29	49	196	234	404	49	15	4
31	31	11	53	7	5	1	12	3	13	2	16	5	66	1	170	22	94	0	9	2	1	335	17	205	28	48	153	231	361	17	9	2
Avril—April 7	81	10	51	2	12	1	10	1	21	0	17	7	60	1	169	12	104	0	15	8	1	335	10	144	22	13	125	203	449	36	6	0
14	48	10	72	12	19	2	13	0	19	0	6	7	75	0	179	20	86	0	19	15	0	336	9	176	25	45	154	296	433	37	9	0
21	35	12	66	10	16	0	8	1	25	1	11	5	57	0	214	20	181	0	59	11	0	404	12	175	19	46	212	245	432	23	15	4
28	64	8	45	7	16	1	7	0	20	3	7	2	71	2	157	13	192	0	19	7	2	313	4	219	32	67	161	267	402	31	4	1
M. May 5	47	7	66	6	11	4	6	2	19	2	10	4	38	0	166	12	158	0	12	6	0	469	6	185	11	41	148	237	330	26	13	3
12	4	10	57	3	9	1	7	1	20	3	9	4	35	1	174	17	236	0	7	5	1	403	5	161	22	40	128	218	391	35	14	3
19	106	8	44	1	27	0	3	0	18	1	10	2	29	0	211	14	187	0	10	6	0	453	14	151	16	84	181	225	315	35	30	3
26	46	4	49	7	26	6	6	1	21	1	12	3	22	1	154	8	208	0	10	6	1	497	7	228	29	116	178	215	270	16	15	1
Juin June 2	71	3	75	2	25	2	1	0	27	4	9	3	17	0	177	10	285	0	16	8	0	487	5	201	20	83	129	207	226	13	14	2
9	68	9	63	3	45	13	4	2	13	3	15	5	32	0	187	17	224	0	10	7	1	378	10	228	29	206	123	226	223	18	27	0
16	161	8	75	7	32	8	7	1	13	2	14	3	15	0	168	14	219	0	13	10	2	509	9	240	21	172	135	259	165	15	5	1
23	88	6	64	4	43	6	6	1	24	2	5	4	25	1	230	13	247	1	12	4	0	347	6	234	22	148	139	188	184	13	13	1
30	96	3	38	5	27	4	2	1	41	1	14	7	10	0	142	12	202	1	15	3	0	269	6	181	20	151	148	148	103	7	13	1
Juillet—July 7	112	8	48	5	33	3	3	2	28	1	14	2	10	0	165	14	201	0	9	4	0	314	6	183	17	127	135	219	165	7	6	1
14	77	3	52	5	42	10	5	1	18	2	8	4	16	2	186	25	151	0	10	8	0	318	10	208	31	205	106	202	123	9	3	0
21	74	4	46	6	90	11	4	4	15	1	10	3	19	0	163	12	164	0	5	10	1	250	9	228	25	119	98	187	111	9	0	0
28	57	11	37	6	168	17	0	0	23	2	9	1	31	1	189	18	123	0	11	9	2	209	10	196	17	133	75	178	50	6	5	4
Août—August 4	73	6	48	3	224	14	1	1	30	2	4	1	12	0	201	18	149	0	7	4	0	121	12	159	21	166	139	153	50	9	4	0
11	91	12	60	6	298	23	2	0	26	0	8	6	19	1	252	24	111	0	6	4	2	121	10	174	20	131	69	192	75	8	7	1
18	110	7	62	14	362	43	3	0	29	0	6	1	16	1	227	19	108	0	7	9	4	99	14	207	24	100	72	122	47	6	4	1
25	66	9	59	5	359	40	0	0	38	1	20	4	7	0	259	26	68	0	3	3	0	127	5	196	26	28	96	159	64	6	17	1
Sept.—Sept. 1	93	16	69	6	326	51	0	0	34	0	13	3	9	0	276	26	74	0	12	9	2	135	11	253	25	146	64	164	64	6	4	0
8	39	10	63	2	292	42	0	0	14	1	22	2	10	0	269	15	76	0	4	5	0	63	1	291	35	60	78	128	42	5	2	0
15	91	16	90	9	350	68	0	0	30	0	13	5	11	0	346	26	43	0	6	5	0	148	12	347	39	93	48	169	73	6	2	4
22	75	7	91	7	361	42	3	2	43	1	13	7	4	0	344	27	38	0	10	5	1	213	14	414	33	120	67	140	43	4	3	0
29	90	10	98	11	328	57	4	1	38	0	21	9	5	0	337	25	44	0	5	5	0	212	4	432	35	47	106	132	41	2	8	1
Oct.—Oct. 6	65	7	81	12	293	48	3	2	36	2	22	9	20	0	473	26	24	0	4	2	0	233	5	475	34	97	86	173	40	4	3	1
13	39	4	79	1	265	59	1	0	55	2	15	2	0	0	431	29	35	0	9	2	1	223	4	503	47	105	64	162	33	3	1	0
20	60	7	103	9	162	34	1	2	37	0	16	8	8	0	561	47	28	1	5	4	2	240	16	550	49	51	60	165	19	3	7	0
27	166	5	134	10	195	41	1	0	35	2	22	9	7	0	514	54	29	0	13	7	0	363	5	619	54	43	62	150	36	3	3	2
Nov.—Nov. 3	199	3	105	8	117	24	6	0	62	2	10	6	6	0	398	42	13	0	5	6	0	244	3	606	59	36	49	137	36	8	6	0
10	125	21	90	11	108	31	0	1	42	2	10	8	3	0	425	50	19	0	6	2	2	334	23	656	50	35	82	170	68	4	0	1
17	226	7	94	9	108	28	6	2	33	1	14	8	16	1	367	40	15	0	10	8	2	522	16	594	58	31	72	141	64	3	2	0
24	70	6	100	17	96	32	2	0	47	1	22	7	3	0	411	29	9	0	8	4	1	595	3	566	64	11	65	149	104	7	8	0
Déc.—Dec. 1	115	1	79	16	83	24	2	0	38	1	12	6	2	0	338	48	12	0	5	2	3	351	7	528	48	38	65	176	62	5	13	3
8	35	9	95	19	67	25	0	0	40	0	6	5	3	0	289	30	8	0	9	9	0	402	12	503	50	22	74	166	81	6	1	0
15	65	13	90	11	22	3	3	0	37	6	14	3	6	0	406	44	12	0	6	3	0	620	10	448	40	19	73	194	84	9	23	11
22	23	6	91	15	16	1	2	0	33	3	14	4	9	0	293	41	6	0	8	5	0	412	16	368	24	33	84	185	126	11	11	1
29	24	2	83	10	21	4	3	0	26	1	10	5	9	0	246	34	10	0	9	4	0	271	13	348	47	33	96	222	156	23	11	1

Autres maladies notifiées: — Other diseases reported:

Année Year	Anthrax Anthrax		Botulisme Botulism		Choléra asiatique Asiatic cholera		Malleus Glanders		Trichinose Trichinosis	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
1919	6	1	29	1	3	3	4	1	63	3
1920	37	10	37	12	57	34	6	4	38	0
1921	66	10	148	6	12	4	4	2	55	0
1922	56	10	157	35	125	34	22	4	35	9
1923	58	11	65	12	0	0	8	5	66	2

Pas de cas de peste ou de lèpre 1919-1923. — No case of plague or leprosy, 1919-1923.

ROUMANIE — ROUMANIA

(Population: 16 700 122. E. 1923)

Nombre de cas de maladies à déclaration obligatoire et de décès dus à ces maladies déclarés en Roumanie, 1919-1923; par mois en 1923.

Number of Cases of and Deaths from Notifiable Diseases reported in Roumania, 1919-1923; by months in 1923.

Source: Rapport spécial pour les années 1919-1923. — Special Report for the Years 1919-1923.

Maladie — Disease			Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Janv. Jan.	Févr. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Coqueluche	Whooping cough	C.	9310	21842	6527	9615	18872	1652	763	665	1051	1508	3019	2504	2652	1584	1076	1296	1102
		D.	881	1195	406	660	1416	56	66	80	80	99	154	180	218	133	117	153	80
Diphtérie	Diphtheria	C.	712	2238	3050	1519	1445	141	95	109	124	77	88	60	95	165	140	214	137
		D.	83	193	312	220	159	17	16	15	13	12	11	2	6	17	10	20	20
Dysenterie	Dysentery	C.	271	3393	2958	996	1391	8	9	6	6	16	102	133	203	164	280	368	96
		D.	76	582	520	175	235	0	0	1	0	2	21	23	29	26	50	59	24
Fièvre récurrente	Relapsing fever	C.	—	19452	4663	444	152	21	3	15	20	10	18	10	19	20	8	8	2
		D.	—	340	84	8	7	1	1	0	1	0	2	1	0	1	0	0	0
Fièvre typhoïde	Enteric fever	C.	3766	6512	6777	5954	5273	513	209	172	150	122	174	293	475	787	737	736	941
		D.	480	731	833	627	561	28	28	20	33	14	6	28	44	72	94	74	120
Scarlatine	Scarlet fever	C.	2179	15562	43670	29027	23706	3400	1288	1053	923	1093	1345	1064	1434	1734	3367	3560	3245
		D.	317	2033	5910	4075	3048	231	202	167	150	177	244	183	228	197	335	473	461
Typhus exanthém.	Typhus	C.	56242	46206	8189	3902	5173	788	945	891	880	697	273	157	83	54	60	129	216
		D.	10015	4651	877	392	515	67	96	95	96	64	33	13	11	3	3	16	18
Variole	Smallpox	C.	20523	3467	2745	865	89	24	19	12	13	4	1	2	6	0	5	2	1
		D.	5834	781	560	153	12	7	2	2	1	0	0	0	0	0	0	0	0

Pas de cas de peste ou de choléra asiatique, 1919–1923.
Lèpre: 41 cas nouveaux depuis 1918, et 68 lépreux survivants parmi ceux qui avaient été recensés avant 1916.

No case of plague or Asiatic cholera, 1919–1923.
Leprosy: 41 new cases since 1918 and 68 cases surviving of those reported before 1916 and still living.

ROYAUME DES SERBES, CROATES ET SLOVÈNES — KINGDOM OF THE SERBS, CROATS AND SLOVENES

(Population: 12 017 323. R. 31 janv. 1921)

Nombre de cas de maladies à déclaration obligatoire et de décès dus à ces maladies déclarés dans les années 1919-1923; par semaine en 1923.

Number of Cases of and Deaths from Notifiable Diseases reported in the years 1919-1923; by weeks in 1923.

Sources: Rapport Sanitaire Hebdomadaire. Bulletin Mensuel du Ministère de la Santé publique, Belgrade.

Semaine finissant: Week ended:	Coqueluche Whooping Cough		Diphtérie Diphtheria		Dysenterie Dysentery		Fièvre typhoïde Enteric fever		Fièvre récurrente Relapsing fever		Rougeole Measles		Oreillons Mumps		Paludisme Malaria		Scarlatine Scarlet fever		Typhus exanthém. Typhus		Variole Smallpox	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
Total 1920			1912	298	11138	1906	3851	444	23	0	17331	495					4940	882	1582	188	4156	941
Total 1921			2667	349	13279	2392	4617	614	69	4	25265	589			28750		15221	2769	1054	130	2119	483
Total 1922			1935	290	2878	371	3906	504	21	6	5084	203			14600	161	18088	3997	232	26	728	165
Total 1923	3962	199	1563	313	3977	637	3549	493	13	0	13094	219	1630	7	21414	153	16521	3669	351	49	1042	199
Janvier — 6	45	2	37	11	11	2	60	12	0	0	62	0	15	0	88	1	401	88	10	1	21	3
January 13	84	4	41	8	11	4	50	10	0	0	74	0	31	0	127	3	435	104	3	1	27	4
20	22	2	50	11	12	4	40	6	0	0	112	1	16	0	95	3	414	100	5	0	46	5
27	46	2	54	15	12	0	50	8	0	0	83	5	8	0	193	4	343	72	9	1	21	2
Février — 3	99	6	54	8	7	0	52	8	0	0	164	1	8	0	129	3	384	81	3	1	50	8
February 10	142	1	47	3	4	1	71	10	0	0	176	3	88	0	72	1	382	81	6	2	26	4
17	79	11	29	1	12	2	59	7	0	0	197	18	23	0	196	0	390	66	8	2	80	12
24	97	15	36	8	7	0	54	8	1	0	313	7	19	0	84	2	383	85	12	1	53	9
Mars — 3	46	4	36	7	11	0	38	8	0	0	158	9	29	0	134	3	348	88	15	4	58	9
March 10	51	5	28	5	15	4	36	8	0	0	289	8	88	0	91	1	246	61	15	5	63	18
17	189	13	26	4	5	0	31	4	0	0	460	13	40	4	104	1	241	54	6	3	41	16
24	91	10	25	8	4	0	45	7	1	0	340	8	32	0	234	2	268	56	16	1	95	11
31	58	7	29	5	13	0	31	4	0	0	163	4	79	0	182	3	187	50	14	2	48	10
Avril — 7	55	4	39	7	10	1	44	10	0	0	241	3	24	0	103	4	205	52	21	1	41	5
April 14	51	6	33	4	10	2	23	5	1	0	201	3	60	1	161	1	234	44	21	6	35	10
21	53	2	32	7	5	0	47	4	0	0	316	3	62	0	148	4	173	39	10	2	40	11
28	24	3	27	5	9	0	42	6	0	0	325	6	421	0	250	0	228	43	19	5	36	5
Mai — 5	68	5	20	2	10	1	31	7	0	0	251	3	64	1	316	0	147	37	15	0	23	6
May 12	25	0	14	2	11	1	16	7	0	0	297	2	53	0	239	3	183	44	27	4	25	8
19	72	0	37	5	9	0	33	4	0	0	165	4	31	0	290	4	180	47	17	1	22	4
26	85	1	30	4	6	1	27	6	0	0	227	4	60	0	230	2	196	36	10	0	13	1
Juin — 2	103	2	27	8	11	1	24	3	0	0	320	5	11	0	228	1	205	47	6	1	19	5
June 9	115	3	22	3	17	0	15	6	0	0	462	7	32	0	221	2	198	47	18	3	17	2
16	219	2	25	0	15	1	21	2	0	0	561	3	15	0	236	2	147	47	0	1	19	4
23	215	5	21	7	24	5	37	8	0	0	586	0	24	0	326	5	167	43	1	0	8	1
30	137	5	23	2	22	0	43	5	0	0	286	4	15	0	308	9	212	45	2	0	11	4
Juillet — 7	99	5	20	1	21	2	33	2	0	0	151	3	8	0	329	0	137	22	4	0	7	1
July 14	190	6	33	5	32	2	34	3	0	0	155	9	11	0	437	0	210	39	1	0	12	2
21	139	4	26	8	60	7	51	7	0	0	206	5	12	0	325	1	162	51	2	0	10	3
28	103	5	25	3	38	2	70	10	0	0	117	2	7	0	688	2	155	31	3	1	5	2
Août — 4	93	8	23	1	71	7	60	7	0	0	75	1	1	0	610	3	223	57	0	0	8	0
August 11	91	9	32	4	118	17	81	7	0	0	36	1	8	0	1744	4	276	56	1	0	3	1
18	95	2	26	2	173	24	111	13	0	0	55	7	7	0	958	0	244	50	1	0	3	2
25	84	5	34	5	230	21	57	6	0	0	65	5	0	0	1069	2	290	55	0	0	1	0
Sept. — 1	59	9	30	4	243	32	78	14	0	0	27	1	2	0	841	5	312	115	3	0	4	2
Sept. 8	39	0	39	13	211	29	102	5	0	0	46	9	1	0	757	6	315	76	0	0	7	2
15	46	5	30	5	307	35	133	13	0	0	69	1	7	0	726	3	247	65	0	0	0	0
22	75	1	38	3	251	49	129	9	0	0	55	1	3	0	844	17	317	79	1	0	1	0
29	34	1	33	2	227	47	125	11	0	0	157	4	24	0	649	6	375	76	0	0	0	0
Oct. — 6	127	7	43	6	252	47	197	16	0	0	184	3	11	0	477	7	421	70	0	0	0	0
Oct. 13	48	0	49	8	151	35	125	11	0	0	268	2	11	0	519	0	504	94	1	0	4	1
20	24	1	64	17	152	37	118	12	0	0	206	3	12	0	367	3	509	94	0	0	3	1
27	50	1	63	6	181	33	137	21	0	0	287	4	16	0	536	4	573	111	1	0	6	0
Nov. — 3	52	0	61	4	203	34	118	15	0	0	396	2	16	0	478	1	633	138	0	0	1	0
Nov. 10	52	6	66	11	208	41	118	24	5	0	448	6	31	0	413	4	620	137	0	0	1	0
17	18	0	53	4	158	31	151	14	0	0	471	3	13	0	2569	4	546	117	8	0	1	0
24	18	1	76	15	165	42	93	18	0	0	380	1	10	1	231	3	564	113	2	0	5	1
Déc. — 1	27	1	66	8	111	21	110	23	0	0	436	2	19	0	254	1	477	111	0	0	15	2
Dec. 8	28	0	48	7	53	7	161	20	4	0	481	0	15	0	217	4	418	101	5	0	0	0
15	54	1	59	5	37	1	84	15	1	0	671	8	4	0	230	5	435	95	4	0	6	1
22	26	0	40	9	19	3	108	17	0	0	441	8	14	0	198	2	323	75	3	0	1	1
29	20	1	44	7	22	4	45	7	0	0	382	4	19	0	164	2	338	84	22	0	0	0

RUSSIE — RUSSIA

(Population: 130 000 000. E. 1923.)

Nombre de cas de certaines maladies transmissibles déclarés en 1922-1923.
Number of Cases of Certain Communicable Diseases reported in 1922-1923.

Source: Rapports du Service statistique du Commissariat du Peuple poer la Santé publique.
Reports from Statistical Division, People Health Commissariat.

Divisions	Anthrax Anthrax		Choléra Cholera		Diphtérie Diphtheria		Dysenterie Dysentery		Fièvre récurr. Relapsing fever		Fièvre typh. Enteric fever		Divisions
	1922	1923	1922	1923	1922	1923	1922	1923	1922	1923	1922	1923	
Région du nord . . .	25	46	235	—	511	559	5 349	3 802	13 939	2 009	3 701	2 245	Northern Region
Région de l'ouest . .	27	120	191	—	3 427	3 729	14 814	7 033	37 416	4 116	10 475	7 226	Western Region
Région centrale . . .	250	250	606	3	7 237	6 861	40 992	18 649	100 507	9 126	30 340	15 845	Central Region
Région du Volga moyen	1 303	1 334	1 113	—	5 228	5 853	53 177	40 415	169 260	29 344	41 683	14 537	Middle Volga Region
Région centrale du sud	405	996	1 644	—	3 092	5 199	28 732	23 548	112 938	19 520	43 259	17 338	South Central Region
Ukraine.	1 153	2 309	41 903	12	13 069	13 353	50 138	25 816	467 893	54 814	97 654	31 514	Ukraine
Région du sud . . .	341	1 198	11 251	86	1 882	2 526	25 567	12 108	114 874	17 711	28 793	8 080	Southern Region
Transcaucasie	188	285	675	—	644	481	3 057	2 592	9 127	1 609	4 835	1 694	Transcaucasia
Crimée	66	147	2 835	—	303	425	843	462	8 906	457	4 193	1 142	Crimea
Région de l'est . . .	119	359	2 523	3	2 288	2 373	52 766	32 324	225 653	67 210	31 343	11 337	Eastern Region
Républ. des Kirghizes	—	178	8 935	2	940	379	15 512	4 848	55 864	5 820	10 274	1 801	Kirghiz Republic
Républ. du Turkestan	24	92	2 522	5	270	263	4 202	2 666	17 296	2 082	2 660	1 059	Turkestan Republic
Sibérie	3	342	9 308	1	686	2 986	11 507	28 247	70 917	28 561	17 585	14 071	Siberia
Chemins de fer et voies fluviales . .	—	145	2 412	2	2 721	2 777	25 677	11 892	145 650	12 018	25 543	5 935	Railways and Waterways
Prisons	—	—	25	—	21	6	1 840	460	13 317	3 874	333	88	Prisons
Total, Russie .	3 904	7 801	86 178	114	42 319	47 770	334 173	214 862	1 563 557	258 271	352 671	133 912	Total, Russia

Divisions	Grippe Influenza		Paludisme Malaria		Scarlatine Scarlet fever		Scorbut Scurvy		Typhus exanth. Typhus		Variole Smallpox		Divisions
	1922	1923	1922	1923	1922	1923	1922	1923	1922	1923	1922	1923	
Région du nord . .	14 704	50 486	22 992	43 666	3 231	4 205	2 318	1 380	32 081	9 968	3 634	9 794	Northern Region
Région de l'ouest . .	23 007	76 720	2 018	16 896	5 549	6 238	3 201	5 088	52 517	10 269	1 427	834	Western Region
Région centrale . . .	79 239	170 894	102 376	224 613	16 409	20 197	19 596	5 582	162 338	27 437	5 635	2 192	Central Region
Région du Volga moyen	86 530	173 105	568 042	1 880 140	10 912	17 148	37 943	11 737	224 400	37 626	7 035	4 772	Middle Volga Region
Région centrale du sud	55 178	106 231	56 791	282 227	6 318	17 137	14 208	5 200	76 457	16 456	4 485	2 240	South Central Region
Ukraine.	—	—	35 712	459 842	18 538	19 474	16 299	—	344 841	31 307	11 095	3 710	Ukraine
Région du sud . . .	21 946	73 027	485 995	985 307	2 948	2 882	4 198	3 260	48 762	6 762	6 760	2 459	Southern Region
Transcaucasie	9 282	3 684	561 248	153 234	204	330	527	712	12 376	2 663	3 261	734	Transcaucasia
Crimée	2 283	10 222	1 396	6 295	963	626	610	453	14 857	828	768	472	Crimea
Région de l'est . . .	38 808	94 878	101 497	425 598	4 203	4 640	31 168	6 374	234 287	60 162	7 912	6 370	Eastern Region
Républ. des Kirghizes .	—	19 492	91 144	171 032	1 330	281	2 496	438	23 087	1 512	3 838	940	Kirghiz Republic
Républ. du Turkestan	1 523	9 189	111 847	80 563	111	95	189	1 223	16 884	1 249	1 163	710	Turkestan Republic
Sibérie	832	113 544	50 079	218 120	4 023	7 128	2 267	1 343	68 481	26 124	2 454	7 221	Siberia
Chemins de fer et voies fluviales . .	202 337	178 762	299 845	602 319	5 294	7 854	8 069	2 952	151 575	9 539	3 174	2 163	Railways and Waterways
Prisons	—	2 782	—	7 004	—	4	2 454	1 829	5 012	988	9	15	Prisons
Total, Russie .	535 669	1 083 016	2 490 982	5 566 856	80 033	108 239	145 543	47 571	1 467 955	242 890	62 650	44 626	Total, Russia

Pour les années avant 1922, les chiffres que nous avons reçus ont été publiés dans *Renseignements épidémiologiques* N° 7. Les chiffres pour l'année 1922 donnés dans ce présent tableau ont été reçus après la publication du rapport N° 7; ceux-ci sont les chiffres définitifs pour 1922.

For years prior to 1922 the figures available were published in *Epidemiological Intelligence No. 7.* The 1922 figures given in this table were received subsequent to the publication of that report; these are the final figures for 1922.

RUSSIE — RUSSIA

Nombre de cas de certaines maladies transmissibles déclarés en 1923, par mois.
Number of Cases of Certain Communicable Diseases reported in 1923, by months.

Source: Rapport du Service statistique du Commissariat du Peuple pour la Santé publique.
Report from Statistical Division, People's Health Commissariat.

Maladie — Disease		Total	Jan. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Juin June	Juill. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
RUSSIE (total) — RUSSIA (total). (Population: 130 000 000. E. 1923.)														
Choléra	Cholera	114	7	2	1	2	14	18	46	21	0	0	0	3
Anthrax	Anthrax	7801	403	327	304	222	329	548	1023	1428	1180	976	565	4961
Diphtérie	Diphtheria	47770	4518	3633	3454	2789	3252	3009	3032	3979	4471	5445	5381	4807
Dysenterie	Dysentery	214862	5031	3858	3768	3972	7016	17980	46079	58880	33113	22093	8088	4984
Encéphalite létharg.	Encephalitis letharg.	949	49	76	76	92	96	97	107	74	78	92	51	61
Fièvre récurrente	Relapsing fever	258271	69401	47111	36848	25478	19990	12694	11009	10398	7564	7276	5333	5169
Fièvre typhoïde	Enteric fever	133912	17055	11897	10761	8268	7499	5914	7388	12659	13401	15783	12880	10407
Grippe	Influenza	1083016	86417	88585	82164	63731	60560	45145	51737	62673	55659	123249	199391	163705
Paludisme	Malaria	5556856	137870	157209	299685	525273	848634	873736	748944	768042	543149	360113	187920	106281
Scarlatine	Scarlet fever	108239	9666	9210	8897	6238	6515	5993	6391	8590	11047	13916	11880	9896
Scorbut	Scurvy	47571	3857	3310	4371	3588	6292	6130	5255	5217	3489	2500	1940	1622
Typhus exanthém.	Typhus	242890	56123	46157	41156	30598	25445	11801	6268	4686	3517	4288	4969	7882
Variole	Smallpox	44626	7239	6705	7388	6437	5634	3241	1774	1409	951	1150	1327	1371
RUSSIE D'EUROPE (Ukraine non comprise) — EUROPEAN RUSSIA (without the Ukraine). (Population: 73 000 000. E. 1923.)														
Choléra	Cholera	92	1	0	0	1	11	16	41	21	0	0	0	1[1]
Anthrax	Anthrax	4112	224	187	166	117	191	307	576	772	589	516	230	237
Diphtérie	Diphtheria	26561	2424	1953	1992	1534	1795	1771	1736	2291	2382	3120	2924	2639
Dysenterie	Dysentery	134955	2881	2381	2225	2197	4151	11959	29755	37218	21369	12937	4639	3243
Encéphalite létharg.	Encephalitis letharg.	583	41	66	51	73	62	62	33	46	51	48	20	30
Fièvre récurrente	Relapsing fever	143428	38625	27534	20992	13723	10352	6913	5691	5772	4076	3615	3002	3133
Fièvre typhoïde	Enteric fever	74749	9789	7109	6213	4667	4113	3637	4347	8027	7228	7706	6394	5519
Grippe	Influenza	735429	54876	59803	54085	41000	41376	30605	33238	42681	36030	71002	141314	129419
Paludisme	Malaria	3560944	77476	100136	206024	359453	567178	595245	483543	471045	308244	199790	118222	74588
Scarlatine	Scarlet fever	72498	6345	6076	5911	4000	4398	4137	4463	6002	7090	9368	7674	7034
Scorbut	Scurvy	38700	3351	2895	3703	2903	4903	5054	4215	4096	2704	1972	1444	1460
Typhus exanthém.	Typhus	167561	38269	31722	29641	20814	17788	8233	4090	3347	2496	2667	3110	5384
Variole	Smallpox	27669	3901	4031	4807	4059	3504	2223	1133	863	648	728	912	860
UKRAINE (Population: 27 000 000. E. 1923.)														
Choléra	Cholera	12	1	2	1	1	3	0	4	0	0	0	0	0
Anthrax	Anthrax	2309	74	63	63	48	77	135	272	433	417	322	224	181
Diphtérie	Diphtheria	13353	1285	942	768	737	931	825	775	1031	1320	1414	1764	1561
Dysenterie	Dysentery	25816	798	438	559	677	1325	2544	3783	4234	3660	4614	2147	1037
Encéphalite létharg.	Encephalitis letharg.	196	5	6	14	9	26	8	5	9	20	36	27	31
Fièvre récurrente	Relapsing fever	54814	16074	9968	7658	5838	5352	3085	1941	1318	1076	900	947	657
Fièvre typhoïde	Enteric fever	31514	3771	2477	2236	1930	1923	1193	1272	2022	2675	4342	4379	3294
Grippe	Influenza	—												
Paludisme	Malaria	459842	2101	2511	5600	23385	65218	88023	76032	73923	58132	37945	18054	8918
Scarlatine	Scarlet fever	19474	1591	1280	948	897	1046	963	1023	1572	2770	2837	2661	1886
Scorbut	Scurvy	—												
Typhus exanthém.	Typhus	31307	8030	5637	4643	4236	3485	1400	680	436	353	478	812	1117
Variole	Smallpox	3710	791	661	335	445	619	229	136	81	98	84	112	119
CAUCASE, SIBÉRIE ET ASIE CENTRALE — CAUCASUS, SIBERIA AND CENTRAL ASIA (Population: 30 000 000. E. 1923.)														
Choléra	Cholera	8	5	0	0	0	0	0	1	0	0	0	0	2[1]
Anthrax	Anthrax	1235	80	63	63	47	51	89	162	209	163	130	108	70
Diphtérie	Diphtheria	5073	561	453	459	339	334	268	381	410	509	555	399	405
Dysenterie	Dysentery	41739	977	711	656	793	954	2099	9783	14291	6581	3619	850	425
Encéphalite létharg.	Encephalitis letharg.	141	3	4	11	10	8	27	30	19	7	8	14	0
Fièvre récurrente	Relapsing fever	44137	9828	6516	5935	4433	3185	2050	2781	2639	2018	2328	1167	1257
Fièvre typhoïde	Enteric fever	21626	2517	1723	1787	1307	1142	845	1469	2092	2960	2992	1592	1200
Grippe	Influenza	166043	13793	11769	14664	11773	10508	7477	11924	10990	10896	26275	21468	14506
Paludisme	Malaria	926747	40463	35911	55302	85075	132261	115412	118349	131324	115041	69855	19649	8105
Scarlatine	Scarlet fever	8409	928	1092	1365	913	665	529	522	467	406	579	542	401
Scorbut	Scurvy	4090	118	93	247	351	720	515	449	561	367	301	318	50
Typhus exanthém.	Typhus	33495	6766	6674	5245	4468	3238	1781	1248	715	527	952	832	1049
Variole	Smallpox	11069	2159	1617	1904	1687	1268	687	407	395	153	247	235	310
VOIES FLUVIALES, CHEMINS DE FERS ET PRISONS — WATERWAYS, RAILWAYS AND PRISONS														
Choléra	Cholera	2	0	0	0	0	0	2	0	0	0	0	0	0
Anthrax	Anthrax	145	25	14	12	10	10	17	13	14	11	8	3	8
Diphtérie	Diphtheria	2783	248	285	235	179	192	145	140	247	260	356	294	202
Dysenterie	Dysentery	12352	375	328	328	305	586	1378	2758	3137	1503	923	452	279
Encéphalite létharg.	Encephalitis letharg.	40	0	0	0	0	0	0	39	0	0	0	1	0
Fièvre récurrente	Relapsing fever	15892	4874	3093	2263	1484	1101	646	596	669	394	433	217	122
Fièvre typhoïde	Enteric fever	6023	978	588	525	364	321	239	300	518	538	743	515	394
Grippe	Influenza	181544	17748	17013	13415	10958	8676	7063	6575	9002	8733	25972	36609	19780
Paludisme	Malaria	609323	17820	18651	32759	57360	83977	75056	71030	91750	61732	52523	31995	14670
Scarlatine	Scarlet fever	7858	802	762	673	428	406	364	383	549	781	1132	1003	575
Scorbut	Scurvy	4781	388	322	421	334	669	561	591	560	418	227	178	112
Typhus	Typhus	10527	3058	2124	1627	1080	934	387	250	188	141	191	215	332
Variole	Smallpox	2178	388	396	342	246	243	102	98	70	52	91	68	82

[1] Mois inconnu. — Month unknown.

SUÈDE — SWEDEN

(Population: 5 970 918. E. 31 déc. 1922)

Nombre de cas de maladies à déclaration obligatoire déclarés en Suède, 1919-1923; par périodes de quinze jours en 1923.
Number of Cases of Notifiable Diseases reported in Sweden, 1919-1923; by half-months in 1923.

Source: Tableau Résumé des Rapports relatifs aux Epidémies, 1923. Rapport spécial pour les années 1919-1922. Special Report 1919-1922.

Année et Quinzaine / Year and Half-month			Diphtérie Diphtheria	Dysenterie Dysentery	Encéphalite léthargique Enceph. leth.	Fièvre typh. et paratyphoïde Enteric fever	Grippe Influenza	Méningite cérébro-spinale Cer.-spin. men.	Poliomyélite Poliomyelitis	Scarlatine Scarlet fever	Gonorrhée Gonorrhœa	Chancre mou Soft chancre	Syphilis acquisita Acquired syphilis			Syphilis congénitale Congen. syph.
													Primaire Primary	Secondaire Secondary	Total	
Total 1919			40514	53	—	3827	210000	116	820	9310	20651	3327	3363	2613	5976	148
Total 1920			26448	71	352	1266	65194	102	181	9750	14996	1237	1756	1528	3284	165
Total 1921			15133	125	1512	1123	20569	120	141	9264	12646	879	1317	940	2257	117
Total 1922			6610	63	192	896	92671	79	112	10718	10953	513	807	648	1455	93
Total 1923			4808	40	536	795	5219	86	313	10916	10798	318	602	528	1130	105
Janvier	January	1-15	233	0	32	74	282	5	1	674	448	15	32	21	53	4
		16-31	305	0	70	50	448	6	6	728	469	15	31	24	55	8
Février	February	1-15	260	1	98	48	438	1	2	663	451	17	25	29	54	2
		16-28	208	0	56	27	616	8	2	450	364	6	21	18	39	6
Mars	March	1-15	184	0	59	16	483	3	1	487	396	16	27	32	59	3
		16-31	244	0	34	19	351	1	0	438	372	15	18	27	45	6
Avril	April	1-15	191	8	20	10	312	3	1	406	399	10	29	22	51	2
		16-30	167	0	19	15	346	4	4	401	353	20	33	24	57	7
Mai	May	1-15	175	1	8	23	344	2	1	485	406	17	24	23	47	7
		16-31	211	0	14	44	192	7	0	550	392	9	31	21	52	4
Juin	June	1-15	188	5	6	41	136	3	0	471	385	10	29	29	58	4
		16-30	155	0	13	28	107	6	4	329	407	7	20	21	41	2
Juillet	July	1-15	174	5	13	20	76	2	2	303	473	15	19	14	33	3
		16-31	159	0	12	26	70	6	8	287	499	16	11	17	28	7
Août	August	1-15	166	0	11	49	41	1	9	251	548	15	33	13	46	1
		16-31	161	3	6	41	45	7	20	332	629	7	23	28	51	4
Septembre	September	1-15	204	0	5	33	73	5	34	377	548	24	26	29	55	5
		16-30	226	0	11	53	127	3	46	437	461	12	25	13	38	3
Octobre	October	1-15	231	0	8	29	116	4	38	498	529	13	22	21	43	7
		16-31	222	3	8	35	114	2	36	528	515	15	27	23	50	3
Novembre	November	1-15	247	0	8	40	88	2	44	488	532	18	29	29	58	4
		16-30	222	9	5	27	106	1	22	505	448	11	22	14	36	8
Décembre	December	1-15	144	2	4	31	160	3	22	437	440	9	22	17	39	2
		16-31	131	3	16	16	148	1	10	391	334	6	23	19	42	3

7 cas de variole en 1919, 11 cas en 1920, 2 cas en 1921; pas de cas en 1922-1923.
Pas de cas de choléra asiatique, peste ou de typhus exanthématique, 1919-1923.

7 cases of smallpox in 1919, 11 cases in 1920, 2 cases in 1921; no case in 1922-1923.
No case of Asiatic cholera, plague or typhus, 1919-1923.

SUISSE — SWITZERLAND

(Population: 3 902 000. E. 30 juin 1923)

Nombre de cas de maladies à déclaration obligatoire déclarés en Suisse, 1919-1923; par semaine en 1923.
Number of cases of notifiable diseases reported in Switzerland, 1919-1923; by weeks in 1923.

Source: Bulletin du Service fédéral de l'hygiène publique, Berne.

Semaine finissant: Week ended:		Coqueluche Whooping cough	Diphtérie Diphtheria	Dysenterie Dysentery	Encéphalite léthargique Encephalitis	Erysipèle Erysipelas	Fièvre puerpérale Puerperal fever	Fièvre typh. et paratyph. Enteric fever	Grippe Influenza	Méningite cérébro-spin. Cerebro-spinal men.	Oreillons Mumps	Poliomyélite aiguë Poliomyelitis acute	Rougeole Measles	Scarlatine Scarlet fever	Varicelle Chickenpox	Variole Smallpox
Total	1919	3121	7690	36	—	204	63	360	86058	30	319	31	9127	3865	1455	3
Total	1920	2514	8456	30	984	298	83	336	139809	39	956	104	15194	3939	1219	2
Total	1921	1675	7702	32	156	232	72	451	2058	32	616	72	3070	3733	2112	596
Total	1922	3439	4415	5	62	200	77	342	60295	30	246	65	3930	2272	2202	1159
Total	1923	1571	3290	10	203	160	57	456	2150	69	185	258	10316	2136	2105	2133
Janvier — January	6	25	87	0	6	6	2	2	36	0	0	1	558	40	67	62
	13	31	99	0	11	7	1	1	64	0	2	0	507	32	53	73
	20	43	80	0	22	2	1	2	41	2	0	2	418	44	71	46
	27	24	81	0	13	4	3	1	40	3	5	2	456	54	85	138
Février — February	3	29	86	0	21	2	0	3	68	1	0	1	449	29	61	88
	10	56	70	0	23	7	0	5	133	0	0	1	490	37	92	61
	17	52	88	0	10	4	2	3	184	2	3	0	405	46	66	82
	24	47	119	0	14	5	3	7	247	1	3	0	450	45	52	84
Mars — March	3	44	101	0	13	6	2	3	239	1	1	0	465	38	71	72
	10	46	90	0	15	6	2	4	264	0	2	3	428	44	33	64
	17	46	84	0	5	2	0	5	98	1	0	0	337	48	35	69
	24	52	83	0	8	6	1	5	112	3	1	4	361	40	39	44
	31	33	62	0	1	3	0	1	81	1	1	4	170	40	32	65
Avril — April	7	25	69	0	2	5	2	2	48	2	5	1	321	57	29	62
	14	41	78	0	2	6	1	4	23	0	épid.	0	184	27	32	35
	21	34	82	0	2	7	1	4	68	0	1	1	205	38	23	66
	28	32	59	1	3	2	0	5	28	1	2	0	174	36	21	73
Mai — May	5	37	44	0	0	2	0	6	25	0	5	2	112	33	17	42
	12	21	59	1	4	1	0	6	12	1	1	1	285	37	56	71
	19	41	72	0	2	2	1	6	12	2	1	1	253	53	33	58
	26	45	63	0	2	3	0	8	8	0	0	4	266	40	16	46
Juin — June	2	30	46	0	0	3	1	19	8	1	1	3	256	31	76	46
	9	54	47	0	3	4	1	10	30	2	3	0	239	37	34	48
	16	41	46	0	0	0	2	7	7	0	4	0	243	34	67	26
	23	18	37	0	2	2	0	10	8	0	10	1	202	42	49	44
	30	54	55	0	1	2	2	18	40	0	2	3	185	28	74	64
Juillet — July	7	40	36	0	0	2	1	12	9	0	3	2	187	34	48	39
	14	35	42	0	0	4	1	11	0	4	3	5	334	26	68	42
	21	19	31	0	2	1	1	16	5	0	1	3	92	27	48	28
	28	72	36	0	0	1	0	13	18	1	6	4	86	25	39	24
Août — August	4	23	29	0	0	2	2	15	13	3	3	4	66	29	17	7
	11	11	28	4	0	2	0	11	0	1	2	1	39	34	15	14
	18	38	22	0	0	2	0	18	4	1	3	15	69	22	9	6
	25	33	37	0	0	0	1	23	4	7	1	11	35	21	14	13
Septembre - September	1	28	51	0	3	1	1	19	13	4	2	10	29	48	10	1
	8	17	57	0	0	1	2	11	4	6	1	7	19	47	10	9
	15	26	62	0	0	3	1	18	12	4	2	8	17	40	25	4
	22	24	53	0	0	1	1	26	4	0	4	11	29	46	33	7
	29	15	76	0	0	0	2	10	6	5	2	7	21	33	19	15
Octobre — October.	6	8	58	4	0	3	0	18	0	1	2	7	25	41	15	3
	13	6	67	0	1	5	3	6	16	0	8	18	75	25	16	22
	20	6	50	0	1	2	3	20	3	4	3	17	83	56	11	21
	27	14	65	0	0	4	2	10	5	0	7	7	35	64	36	15
Novembre - November	3	21	69	0	2	2	1	7	12	0	6	21	57	48	37	20
	10	29	49	0	1	1	0	7	8	0	1	13	58	42	16	19
	17	24	75	0	1	7	1	7	5	0	2	11	65	48	24	12
	24	20	60	0	1	4	0	9	26	0	6	15	101	64	49	22
Décembre - December	1	5	66	0	2	4	1	9	11	0	9	8	86	71	56	39
	8	14	58	0	3	1	1	8	5	2	6	2	99	58	49	25
	15	17	85	0	1	2	1	3	12	1	7	6	65	53	84	32
	22	16	69	0	0	3	0	0	10	0	9	4	66	39	32	38
	29	9	79	0	0	3	3	2	21	1	33	6	59	65	41	27

Autres maladies notifiées: — Other diseases notified:

	Anthrax Anthrax	Fièvre récurrente Relapsing fever	Gastro-entérite Gastro-enteritis	Hoquet épidém. Epidem. hiccough	Maladie de Weil Weil's disease	Ophthalmia neonthorum Ophthalmia of newborn	Paludisme Malaria	Rubéole Rubeolae	Stomatite Stomatitis	Tétanos Tetanus	Trachome Trachoma	Typhus exanthém. Typhus
1919	—	—	67	—	—	15	—	238	—	—	—	—
1920	—	1	8	—	—	10	24	352	—	—	—	1
1921	1	0	2	64	7	9	5	237	6	2	3	2
1922	0	0	8	21	0	8	3	43	0	0	5	0
1923	2	0	0	43	0	13	5	56	2	2	8	0

TCHÉCOSLOVAQUIE — CZECHOSLOVAKIA

Population: 13 840 443. E. 1923.

Nombre de cas de maladies à déclaration obligatoire et de décès causés par ces maladies déclarés en Tchécoslovaquie, 1919-1923; par mois en 1923
Number of Cases of and Deaths from Notifiable Diseases reported in Czechoslovakia, 1919-1923; by months in 1923.

Source: Rapports spéciaux du Ministère de Santé publique et d'Education.
Special Reports from the Ministry of Public Health and Education.

Maladie — Disease			Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Anthrax	Anthrax	C.	1	5	49	81	54	2	2	5	4	7	2	6	10	8	4	3	1
		D.	1	3	6	5	5	0	1	1	0	0	0	0	0	1	1	0	1
Diphtérie	Diphtheria	C.	4608	4872	4380	3223	3159	320	272	216	269	209	231	188	181	211	347	402	313
		D.	554	637	470	327	231	32	23	18	14	17	22	8	5	16	24	29	23
Dysenterie	Dysentery	C.	7120	8211	8238	1453	1539	36	29	62	26	38	58	76	252	423	285	181	73
		D.	990	1129	953	141	101	2	0	2	2	1	2	4	9	35	27	15	2
Encéphalite léthargique	Encephalitis lethargica	C.	—	—	—	150	366	70	100	85	44	14	18	6	5	3	6	4	11
		D.	—	—	—	59	119	28	30	20	15	5	8	0	1	3	3	1	5
Fièvre puerpér.	Puerperal fever	C.	558	729	720	643	638	43	59	69	63	58	38	47	58	51	53	58	41
		D.	252	386	361	318	277	19	20	31	29	24	18	19	24	22	31	27	13
Fièvre récurr. [a]	Relapsing fever	C.	19	19	14	31	0												
Fièvre typhoïde et paratyph.	Enteric fever	C.	7796	7399	9331	6612	5508	344	290	341	268	255	287	390	568	771	775	701	518
		D.	1015	958	969	651	416	26	30	24	37	30	29	24	27	48	50	54	37
Grippe	Influenza	C.				86788	1407												
		D.				597	57	Les rapports mensuels manquent. — Monthly figures are not given.											
Méningite cérébro-spinale	Cerebro-spinal meningitis	C.	67	75	80	190	142	9	11	29	23	12	17	10	7	3	9	8	4
		D.	29	24	34	73	46	3	2	9	6	4	5	4	1	1	4	5	2
Paludisme	Malaria	C.	1592	229	130	76	266	0	1	4	2	4	39	88	108	12	1	6	1
		D.	3	3	0	2	1	0	0	0	0	0	0	0	1	0	0	0	0
Rage humaine	Human rabies	C.	8	7	24	52	22	1	2	0	1	4	3	0	2	1	4	4	0
		D.	8	7	24	52	22	1	2	0	1	4	3	0	2	1	4	4	0
Scarlatine	Scarlet fever	C.	3685	4188	9425	10784	10522	878	652	633	614	552	728	592	528	819	1501	1670	1355
		D.	160	156	906	1215	755	81	53	64	63	59	60	42	46	39	100	74	74
Trachome	Trachoma	C.	4251	3308	3252	2739	3338	306	167	214	391	529	403	220	223	176	224	225	260
Typhus exanth.	Typhus	C.	2457	3019	970	321	366	79	45	70	33	58	40	9	8	3	0	1	20
		D.	169	644	111	28	10	1	5	1	0	1	2	0	0	0	0	0	0
Variole	Smallpox	C.	11209	4529	1542	70	36	4	0	12	7	9	0	0	1	2	0	0	1
		D.	1091	723	312	11	5	0	0	0	1	3	0	0	0	0	0	0	1

7 cas et 2 décès de morve en 1923, pas de cas en 1919-1922. — 7 cases and 2 deaths from glanders in 1923, no case in 1919-1922.
Pas de cas de choléra asiatique et pas de décès de fièvre récurrente, 1919-1923. — No case of asiatic cholera and no death from relapsing fever, 1919-1923.

AFRIQUE — AFRICA

ALGÉRIE — ALGERIA

(Population: 5 806 090. R. 6 mars 1921.)

Nombre de cas de maladies à déclaration obligatoire déclarés en Algérie, 1919-1923; par mois en 1923.
Number of Cases of Notifiable Diseases reported in Algeria, 1919-1923; by months in 1923.

Source: Bulletin Sanitaire de l'Algérie, 1921-1923. Rapport spécial pour les années 1919-1920. — Special Report for 1919-1920

Maladie — Disease		Total 1919	Total 1920	Total 1921	Total 1922	Total 1923[1]	Janv. Jan.	Févr. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Conjonctivite purul. et ophtalmie granuleuse	Purul. conjunctivitis and granulous ophthalmia	1	1		1	6	0	0	2	0	0	3	0	1	0	0	0	0
Coqueluche	Whooping cough	14	26	18	20	51	5	7	25	0	2	5	2	3	1	1	0	0
Diphtérie	Diphtheria	158	192	726	370	439	33	18	43	21	20	26	19	35	63	66	37	58
Dysenterie	Dysentery	25	12	41	118	306	2	0	4	2	1	79	55	89	26	12	21	15
Encéphalite létharg.	Encephalitis letharg.		20	11	13	7	0	0	1	0	1	2	0	0	0	1	2	0
Erysipèle	Erysipelas	20	25	38	30	29	3	2	4	1	3	2	2	0	1	3	4	4
Fièvre méditerran.	Mediterranean fever	2	7	18	11	9	0	0	2	4	0	0	2	0	0	0	0	1
Fièvre récurrente	Relapsing fever	10	2	18	5	4	0	0	0	1	0	0	0	0	1	0	2	0
Fièvre typhoïde	Enteric fever	353	820	1288	751	712	93	59	62	58	61	33	48	71	49	49	49	80
Grippe	Influenza	1166	288	204	944	411	34	48	80	34	11	17	11	2	0	0	9	165
Infections puerpérales	Puerperal infections	10	17	12	33	19	1	2	2	1	4	1	1	0	3	1	1	2
Maladies à trypanosome et à pyroplasmes	Trypanosomions and Kala-azar	0	0	1	0	0												
Lèpre	Leprosy	1	1	1	4	3	0	0	0	0	0	0	0	3	0	0	0	0
Maladies cholériformes	Cholera nostras	0	3	2	32	5	0	0	0	0	0	1	3	0	1	0	0	0
Méningite cérébro-spinale	Cerebro-spinal meningitis	39	25	31	61	61	9	9	11	5	8	4	3	4	1	1	4	2
Oreillons	Mumps	42	43	358	395	922	225	156	89	74	30	56	5	0	2	4	44	237
Paludisme	Malaria	7	8	156	206	257	16	20	17	16	10	9	12	8	38	39	55	17
Peste	Plague	4	32	195	19	6	0	0	0	0	2	0	0	3	0	0	1	0
Pneumonie et broncho-pneumonie	Pneumonia and broncho-pneumonia	514	423	736	1563	1226	213	146	106	100	69	59	83	91	85	49	41	184
Poliomyélite aiguë	Acute poliomyelitis	1	1	13	2	5	1	0	0	2	1	0	0	0	0	1	0	0
Rougeole	Measles	159	296	726	1647	732	170	134	127	48	75	29	11	34	3	2	9	80
Scarlatine	Scarlet fever	102	103	87	111	163	26	14	8	14	20	13	16	12	14	6	8	12
Suette miliaire	Miliary fever	0	0		0	1	0	0	0	0	1	0	0	0	0	0	0	0
Teigne	Thrush	0	1	3	1	0												
Tuberculose pulmon.	Pulmon. tuberculosis	235	485	1171	1416	1323	116	82	128	122	127	106	104	113	122	110	69	124
Typhus exanthém.	Typhus	649	1078	6360	1233	1666	41	78	145	218	298	420	230	68	36	11	53	68
Variole	Smallpox	812	1172	755	184	139	8	7	17	5	5	13	15	11	24	13	14	7

Pas de cas de fièvre jaune, 1919-1923. — No case of yellow fever, 1919-1923.

[1] Les chiffres définitifs pour l'année 1923 (les chiffres mensuels manquent) relatifs à quelques maladies sont: coqueluche 50 cas, oreillons 919 cas, paludisme 31 cas, rougeole 692 cas, variole 141 cas.

[1] Revised totals for 1923 (monthly figures not available) for following diseases were: whooping cough 50, mumps 919, malaria 231, measles 692, smallpox 141.

BASSOUTOLAND — BASUTOLAND

Population: 498 781. R. mai 1921.

Nombre de cas des maladies infectieuses et des décès causés par ces maladies déclarés en 1921, 1922 et 1923; par périodes de quatre semaines en 1923.

Number of Cases of and Deaths from Certain Infectious Diseases reported in 1921, 1922 and 1923; by four-week periods in 1923.

Source: Rapports périodiques du Ministère britannique de Santé, 1923.
Current Reports from British Ministry of Health, 1923. The Lancet, London; March 10th, 1923, and January 5th, 1924.

Période de quatre semaines finissant: Four-week period ending:	Dysenterie Dysentery		Grippe Influenza		Méningite cérébrospinale Cerebro-spinal meningitis		Pneumonie Pneumonia		Typhus exanthématique Typhus		Variole Smallpox	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
Total 1921	187	14	963	2			79	2	503	93	521	53
Total 1922	89	2	530	2	4		77	6	402	70	421	46
Total 1923	57	1	333	0	8	1	104	2	931	128	675	19
Janvier—January 27	3	0	2	0	0	0	4	1	12	2	76	1
Février—February 24	5	0	22	0	0	0	11	0	27	1	78	0
Mars—March 24	4	0	22	0	0	0	7	0	26	3	22	0
Avril—April 21	2	0	23	0	0	0	6	0	21	1	47	2
Mai—May 19	3	0	16	0	0	0	5	0	14	1	22	2
Juin—June 16	2	1	8	0	0	0	2	0	38	0	1	0
Juillet—July 14	3	0	11	0	0	0	6	0	63	10	153	1
Août—August 11	1	0	18	0	0	0	4	0	164	24	89	7
Septembre—September 8	1	0	41	0	6	0	9	0	145	26	77	1
Octobre—October 6	2	0	74	0	0	0	8	1	96	21	52	0
Novembre—November 3	2	0	51	0	2	1	19	0	109	10	25	0
Décembre—December 1	15	0	31	0	0	0	14	0	118	18	8	2
29	14	0	14	0	0	0	9	0	98	11	25	3

Pas de cas de choléra asiatique, peste ou de fièvre jaune, 1921-1923.
No case of Asiatic cholera, plague or yellow fever, 1921-1923.

COTE DE L'OR — GOLD COAST

Population: 2 029 754. R. 1921.

Nombre de cas de maladies à déclaration obligatoire et de décès causés par ces maladies déclarés dans chaque mois de 1923.
Number of Cases of and Deaths from Notifiable Diseases reported in each month of 1923.

Source: Rapports du Gouvernement de la Côte de l'Or. — Reports from the Government of the Gold Coast.

Maladie — Disease			Total 1923	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Juin June	Juill. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Dysentérie	Dysentery	C.	406	33	41	35	36	29	62	50	37	17	17	22	27
		D.	38	2	3	3	3	2	6	6	8	1	1	3	0
Fièvre jaune	Yellow fever	C.	26	4	4	5	2	4	6	1	0	0	0	0	0
		D.	18	3	2	1	3	4	4	1	0	0	0	0	0
Fièvre récurrente	Relapsing fever	C.	160	0	0	7	50	43	17	10	6	7	14	3	3
		D.	3	0	0	0	3	0	0	0	0	0	0	0	0
Grippe	Influenza	C.	55	27	13	5	1	2	0	1	0	0	1	5	0
		D.	0												
Pneumonie	Pneumonia	C.	332	50	39	31	29	21	17	21	21	27	10	27	39
		D.	69	4	6	7	3	6	6	11	7	5	3	5	6
Variole	Smallpox	C.	13	2	3	1	7	0	0	0	0	0	0	0	0
		D.	0												

Pas de cas de choléra ou de peste en 1923. — No case of cholera or smallpox in 1923.

ÉGYPTE — EGYPT

(Population: 13 473 800. E. 30 juin 1922)

Nombre de cas de maladies à déclaration obligatoire et de décès dus à ces maladies déclarés en 1919–1923, par semaines en 1923.
Number of Cases of and Deaths from Notifiable Diseases reported im 1919-1923; by weeks in 1923.

Source: Weekly Return of Births, Deaths and Infectious Diseases.

Semaine finissant: Week ending:		Diphtérie Diphtheria		Fièvre récurrente Relapsing fever		Fièvre typhoïde Enteric fever		Méningite céré.-spin. Cere.-spinal meningitis		Peste Plague		Rougeole Measles		Scarlatine Scarlet fever		Typhus exanthém. Typhus		Varicelle Chickenpox		Variole Smallpox	
		C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
Total 1919		977	347	3221	591	2707	587	85	52	877	473	3514	1642	206	15	16986	5573	458	28	7928	1938
Total 1920		810	316	2898	429	1799	426	43	28	463	269	9244	3753	135	19	13253	3510	453	9	3021	805
Total 1921		873	336	1208	197	1380	346	43	19	358	153	3048	1254	166	15	4487	1271	372	1	93	24
Total 1922		959	422	172	35	1689	437	41	25	487	228	5607	2583	134	3	2489	723	337	—	309	90
Total 1923		1137	464	39	6	1765	466	44	37	1519	725	17871	7673	107	5	1935	603	522	13	519	145
Janvier — January	7	22	6	0	0	32	8	0	0	0	0	211	52	0	0	8	5	9	2	4	1
	14	16	12	0	0	9	2	2	2	1	1	325	120	5	0	28	4	8	0	3	0
	21	16	3	1	0	26	4	1	1	0	0	413	172	4	0	25	4	6	0	7	0
	28	10	3	0	0	20	6	0	0	2	1	332	111	3	0	32	8	20	0	4	0
Février — February	4	21	6	0	0	30	4	0	0	4	2	373	118	2	0	37	6	16	0	1	0
	11	25	6	0	0	20	3	1	0	2	2	522	171	1	0	15	9	23	1	5	2
	18	16	6	4	1	12	3	0	0	3	0	569	159	1	0	26	7	17	1	7	1
	25	22	13	2	0	16	0	0	0	2	3	691	197	1	0	52	10	20	1	2	0
Mars — March	4	17	4	0	0	16	7	2	3	8	5	651	177	4	0	39	10	24	0	11	4
	11	21	8	0	0	15	7	1	1	11	8	775	208	3	0	68	10	21	0	7	6
	18	13	5	0	0	12	4	3	1	20	9	643	229	3	0	58	14	22	1	3	0
	25	22	3	0	0	16	4	1	1	50	24	849	207	1	0	118	18	31	1	6	1
Avril — April	1	7	4	0	0	8	1	0	0	71	31	724	232	2	0	74	10	16	0	10	2
	8	7	5	0	0	11	6	1	1	68	33	507	199	2	0	68	17	23	0	3	1
	15	9	1	0	0	13	4	1	1	83	39	626	229	1	0	58	16	14	0	4	0
	22	11	5	0	0	17	8	0	0	73	45	584	223	4	0	67	15	32	0	29	1
	29	9	5	1	0	14	4	1	1	100	57	556	237	5	0	67	25	36	1	5	1
Mai — May	6	16	2	0	0	23	7	1	1	92	54	680	296	3	1	83	17	31	1	28	5
	13	11	4	0	0	29	4	2	2	127	79	429	204	3	0	100	31	24	1	15	2
	20	16	7	5	0	32	6	3	3	52	31	476	233	3	1	57	17	7	2	8	2
	27	25	7	5	1	35	14	5	5	71	23	669	295	5	1	85	25	18	0	14	4
Juin — June	3	14	6	1	1	40	7	2	2	84	33	486	281	2	0	74	16	19	0	29	6
	10	17	6	0	0	33	10	0	0	53	28	513	321	2	0	99	27	12	0	16	7
	17	14	5	6	2	36	10	0	0	59	32	483	273	1	1	65	19	9	1	11	6
	24	18	6	2	0	29	9	2	2	33	18	697	356	1	0	49	22	3	0	1	0
Juillet — July	1	26	10	0	0	54	14	0	0	41	14	566	283	4	0	59	19	7	0	14	6
	8	24	13	4	1	61	17	0	0	33	14	645	304	2	0	44	22	4	0	42	11
	15	16	5	1	0	59	14	1	1	48	14	470	274	4	0	39	20	0	0	27	10
	22	15	5	1	0	43	8	1	0	20	15	309	239	3	0	32	20	1	0	7	2
	29	23	11	1	0	43	21	1	1	47	8	212	134	1	0	19	13	2	0	5	4
Août — August	5	25	17	0	0	51	17	1	1	28	10	220	151	1	0	13	10	3	0	9	3
	12	13	9	0	0	59	12	1	0	7	3	229	129	0	0	12	10	3	0	2	2
	19	24	10	0	0	60	17	0	0	21	3	226	158	1	0	16	8	5	0	22	7
	26	36	18	1	0	50	14	0	0	8	5	187	112	0	0	22	13	0	0	0	0
Septembre—September	2	38	16	1	0	63	22	1	0	15	4	108	64	0	0	12	5	1	0	0	1
	9	24	14	0	0	64	19	1	1	4	3	128	91	1	0	7	2	0	0	0	0
	16	17	8	0	0	43	9	0	0	2	2	173	104	0	0	9	6	1	0	1	0
	23	15	13	0	0	50	18	0	0	0	0	74	55	0	0	13	9	1	0	0	0
	30	31	15	0	0	52	13	0	0	6	3	113	53	1	0	10	4	0	0	0	0
Octobre — October	7	36	13	0	0	56	10	0	0	13	5	58	36	2	0	4	1	2	0	2	0
	14	28	14	1	0	39	8	1	1	16	5	80	53	0	0	9	2	0	0	2	0
	21	43	15	0	0	43	9	2	0	11	3	27	11	4	1	12	6	0	0	1	0
	28	38	15	0	0	28	4	0	0	6	3	38	28	2	0	6	4	2	0	0	0
Novembre — November	4	26	8	0	0	32	13	0	0	18	14	42	23	3	0	10	4	2	0	2	0
	11	29	15	0	0	28	7	0	0	5	1	30	14	2	0	15	6	5	0	0	0
	18	38	13	0	0	23	6	0	0	4	2	11	12	0	0	12	6	2	0	3	0
	25	34	14	0	0	36	11	0	0	15	2	33	11	3	0	13	10	6	0	6	5
Décembre—December	2	33	13	1	0	33	4	0	0	11	5	22	5	3	0	18	4	2	0	19	3
	9	34	13	0	0	43	12	0	0	14	8	8	6	1	0	20	7	3	0	27	13
	16	26	9	1	0	36	6	3	3	29	6	9	8	0	0	19	7	4	0	43	12
	23	24	9	0	0	34	10	1	1	13	9	37	5	4	0	15	8	3	0	24	5
	30	26	11	0	0	38	9	1	1	15	6	32	10	3	0	23	15	2	0	28	9

Choléra asiatique: un cas a été constaté en 1920. — Asiatic cholera: one case reported in 1920.

KENYA ET LE PROTECTORAT AFRICAIN DE L'EST — KENYA AND THE EAST AFRICAN PROTECTORATE

(Population: 2 376 000. R. 24 avril 1921)

Nombre de cas de méningite cérébro-spinale, de peste et de variole constatés en 1923; par périodes de quatre semaines.
Number of Cases of Cerebro-spinal Meningitis, Plague and Smallpox reported in 1923; by four-week periods.

Source: Rapports du médecin principal. — Reports from the Principal Medical Officer.

Maladie — Disease		Total 1923	31 déc. 27 janv.	28 janv. 24 fév.	25 fév. 24 mars	25 mars 21 avril	22 avril 19 mai	20 mai 16 juin	17 juin 14 juill.	15 juill. 11 août	12 août 8 sept.	9 sept. 6 oct.	7 oct. 3 nov.	4 nov. 1er déc.	2 déc. 29 déc.
Méningite cérébro-spinale	Cerebro-spinal meningitis	48	2	5	1	2	3	12	2	2	5	5	6	1	2
Peste	Plague	1090	0	16	2	2	8	336	281	128	23	83	28	48	135
Variole	Smallpox	45	0	0	5	3	27	2	6	0	2	0	0	0	0

Les rapports médicaux annuels précédents mentionnent la fréquence de la peste et de la variole, mais ne donnent pas des chiffres exacts à leur sujet. Le nombre de cas de méningite cérébro-spinale a été pour 1919, 133; pour 1920, 60; pour 1921, 71.

The Annual Medical Reports for previous years discuss the prevalence of plague and smallpox, but do not give the exact figures. Cases of cerebro-spinal meningitis were reported as follows: 1919, 133; 1920, 60; 1921, 71.

MAURICE — MAURITIUS

Population: 383 746. R. mai 1921.

Nombre de cas de maladies à déclaration obligatoire et de décès causés par ces maladies déclarés dans les années 1919-1923; par mois en 1923

Number of Cases of and Deaths from Notifiable Diseases reported in the years 1919-1923; by months in 1923.

Source: Rapports du Ministère britannique de Santé, 1923. — Reports from British Ministry of Health, 1923. Annual Report on the Medical and Health Departments, 1920-1922.

Maladie — Disease			Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Dysenterie	Dysentery	D.	1026	499	497	496	321	24	25	40	41	38	33	30	26	28	11	15	10
Grippe	Influenza	D.	—	334	1563	631	544	14	20	20	19	36	43	87	79	57	59	60	50
Peste	Plague	C.	*a*	*a*	375	98	139	18	6	8	2	6	4	3	8	8	25	26	25
		D.	*a*	*a*	297	75	119	17	5	8	2	6	3	3	6	7	21	21	20
Pneumonie	Pneumonia	D.	—	924	1875	1318	1081	85	55	70	70	66	57	115	121	124	121	114	83

Autres maladies déclarés: — Other diseases notified:

	Diphtérie Diphtheria		Erysipèle Erysipelas		Fièvre puerpérale Puerperal fever	Fièvre typhoïde et paratyphoïde Enteric fever		Méningite cérébrospin. Cerebro-spin. meningitis		Rougeole Measles		Scarlatine Scarlet fever
	C.	D.	C.	D.	C.	C.	D.	C.	D.	C.	D.	C.
1919	—	—	—	—	—	190	39	—	—	—	—	—
1920	24	5	49	11	—	168	43	1	0	2	—	—
1921	38	3	47	7	18	288	28	5	0	303	46	0
1922	25	1	20	17	21	224	—	1	0	0	0	0

Pas de cas de choléra asiatique, fièvre jaune, fièvre récurrente, typhus exanthématique ou de variole, 1920-1923.
No case of Asiatic cholera, yellow fever, relapsing fever, typhus or smallpox, 1920-1923.

a Pas de rapports officiels pour la peste de 1915 à 1920. — No official records available for plague during period 1915-1920.

NYASSALAND — NYASALAND

(Population: 1 201 983. R. 2 avril 1921)

Nombre de cas de maladies à déclaration obligatoire déclarés en Nyassaland, 1919-1923; par mois en 1923.

Number of Cases of Notifiable Diseases reported in Nyasaland, 1919-1923; by months in 1923.

Source: Rapport médical annuel, 1919-1922; Rapports mensuels du Département sanitaire, 1923. Annual Medical Report, 1919-1922; Monthly Reports from the Sanitation Department, 1923.

Maladie — Disease		Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Béri-béri	Beri-beri	0	53	8	4	—												
Coqueluche	Whooping-cough	5	8	3	—	13	2	3	0	0	0	0	0	0	0	0	8	0
Diphtérie	Diphtheria	—	5	1	0	—												
Dysentérie	Dysentery	277	476	329	329	—												
Fièvre hématurique	Blackwater fever	6	11	14	14	1	0	0	0	0	0	0	0	0	0	0	0	1
Fièvre récurrente	Relapsing fever	—	—	24	47	41	2	3	11	1	2	1	1	0	0	10	6	4
Fièvre typhoïde et paratyphoïde	Enteric fever	5	3	2	2	3	0	0	0	1	1	0	0	0	1	0	0	0
Grippe	Influenza	—	—	—	—	3043	6	24	1725	630	67	131	391	4	31	31	3	0
Lèpre	Leprosy	4	4	20	19	—												
Méningite cérébro-spinale	Cerebro-spinal meningitis	—	—	—	—	1	0	0	0	0	0	0	0	0	1	0	0	0
Paludisme	Malaria	299	691	1122	1611	—												
Peste	Plague	—	—	2	0	7	0	7	0	0	0	0	0	0	0	0	0	0
Pneumonie	Pneumonia	48	44	166	—	—												
Pian	Yaws	13	39	238	387	—												
Rougeole	Measles	2	14	11	—	62	0	0	0	5	0	0	0	0	0	9	20	28
Tuberculose, toutes formes	Tuberculosis, all forms	24	17	28	40	17	4	1	0	0	2	3	1	1	3	1	0	1
Varicelle	Chickenpox	18	66	16	57	20	0	1	0	0	0	0	0	0	0	16	3	0
Variole	Smallpox	—	—	—	—	14	0	0	0	0	0	0	0	0	0	0	13	1

Les statistiques vitales concernant la population indigène n'existant pas, la fréquence des maladies suivantes n'est pas exactement connue: paludisme, maladie du sommeil, peste, ankylostomiase, fièvre spirillum, pian, variole, rougeole, lèpre, maladies vénériennes et schistomiase. La peste existe à l'état endémique dans le Nyassa septentrional et des cas sporadiques sont signalés périodiquement. Les rapports de cas de variole sont rares.

In the absence of any vital statistics regarding the native population, there is no exact knowledge as to the prevalence of the following diseases: Malaria, trypanosomiasis, plague, ankylostomiasis, spirillum fever, yaws, smallpox, measles, leprosy, venereal diseases and schistomiasis. Plague is endemic in the North Nyasa district and sporadic outbreaks occur periodically. Reports of outbreaks of smallpox are rare.

OUGANDA — UGANDA

Population: 3 071 608. R. avril 1921.

Nombre de cas de méningite cérébro-spinale, de peste et de variole déclarés en Ouganda, 1919-1923, et de décès causés par ces maladies; par mois en 1923.

Number of Cases of and Deaths from Cerebro-spinal Meningitis, Plague and Smallpox reported in Uganda, 1919-1923; by months in 1923.

Source: Rapports périodiques du Ministère britannique de Santé, 1923. Current Reports from British Ministry of Health, 1923. Annual Medical and Sanitary Report, 1919-1922.

Maladie — Disease			Total 1921	Total 1922	Total 1923	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Juin June	Juillet July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Méningite cérébro-spin.	Cerebro-spinal meningitis	C.		677	203	13	27	59	13	27	3	12	16	14	12	3	4
		D.	*a*	471	87	9	9	16	4	13	3	7	6	7	6	3	4
Peste *b*	Plague *b*	C.		1362	948	73	27	18	7	70	112	172	114	104	97	94	60
		D.	5871	1305	914	73	27	15	5	66	114	164	107	104	94	89	56
Variole	Smallpox	C.	506	104	97	3	52	14	4	4	8	1	0	6	3	1	1
		D.	89	12	10	1	3	2	0	1	1	0	0	1	0	1	0

Pas de cas de choléra, fièvre jaune ou de typhus exanthématique, 1921-1923. — No case of cholera, yellow fever or typhus, 1921-1923.

a Pas d'épidémie importante de méningite cérébro-spinale à signaler, mais des cas sporadiques ont été notifiés de Kampala, Toro et Soroti.

a No serious epidemic of cerebro-spinal meningitis occurred, but sporadic cases were reported from Kampala, Toro and Soroti.

b La peste a causé 1022 décès en 1919 et 1732 décès en 1920. Renseignements relatifs à la variole et à la méningite cérébro-spinale ne sont pas inclus dans les rapports reçus.

b Deaths from plague in 1919 numbered 1022, in 1920 were 1732. Reports for cerebro-spinal meningitis and smallpox are not included in the reports received.

RHODÉSIE DU NORD — NORTHERN RHODESIA

(Population: 983 539. R. 3 mai 1921.)

Nombre de cas de maladies transmissibles et de décès dus à ces maladies constatés en 1923, par périodes de quatre semaines.

Number of Cases of and Deaths from Communicable Diseases reported in 1923, by four-week periods.

Source: Rapports du Ministère britannique de Santé. — Reports from British Ministry of Health.

Maladie — Disease			Total	Jan. Jan. 29	Fév. Feb. 26	Mars March 26	Avril April 23	Mai May 21	Juin June 18	Juill. July 16	Août Aug. 13	Sept. Sept. 10	Oct. Oct. 8	Nov. Nov. 5	Déc. Dec. 3	Déc. Dec. 31
Dysentérie	Dysentery	C.	33	2	2	4	2	3	5	3	0	0	1	0	0	11
		D.	6	0	2	0	1	0	1	0	0	0	0	0	0	2
Fièvre récurrente	Relaps. fever	C.	42	2	0	8	1	0	1	2	7	2	10	4	1	4
		D.	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Grippe	Influenza	C.	1963	135	100	155	146	163	127	78	130	161	183	210	228	147
		D.	86	7	3	8	4	6	3	2	4	3	13	7	17	9
Méningite cérébro-spinale	Cerebro-spinal meningitis	C.	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		D.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Variole	Smallpox	C.	59	0	0	0	0	19	0	0	0	0	0	0	0	0
		D.	9	0	0	0	0	4	0	0	0	0	0	0	0	40
																5

RHODÉSIE DU SUD — SOUTHERN RHODESIA

(Population: 899 187. R. 3 mai 1921)

Nombre de cas de maladies infectieuses et de décès causés par ces maladies, déclarés en 1921, 1922 et 1923; par périodes de quatre semaines en 1923.

Number of Cases of and Deaths from Certain Infectious Diseases reported in 1921, 1922 and 1923; by four-week periods in 1923.

Sources: Rapport annuel sur la Santé publique, 1921; Rapports hebdomadaires du Département de la Santé publique, 1922 et 1923
Annual Report on the Public Health, 1921; Weekly Reports from Public Health Department, 1922 and 1923.

Période de quatre semaines finissant: Four-week period ending:			Coqueluche Whooping cough	Diphtérie Diphtheria	Fièvre typhoïde et paratyphoïde Enteric fever		Grippe Influenza		Méningite cérébro-spinale Cerebro-spinal meningitis		Oreillons Mumps	Rougeole Measles	Scarlatine Scarlet fever	Varicelle Chickenpox	Variole Smallpox	
			C.	C.	C.	D.	C.	D.	C.	D.	C.	C	C.	C.	C.	D.
Total 1921			6	8	5	—	1086 *a*	69	—	—	3	40	5	23	515 *a*	145
Total 1922			0	0	10	0	1259 *a*	19	3	1	0	3	4	96 *a*	501 *a*	21
Total 1923			76 *a*	3	13	2	47 *a*	60	6	2	73 *a*	12	4	72 *a*	16 *a*	8
Janvier	— January	24	0	0	1	0	0	0	1	0	0	0	0	6	0	0
Février	— February	21	0	0	2	0	0	0	0	0	0	0	0	0	1	0
Mars	— March	21	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Avril *	— April *	18	0	0	0	0	0	0	0	0	0	0	0	2	2 *a*	0
Mai	— May	16	0	3	0	2	0	0	0	0	0	9	0	8	13	8
Juin	— June	13	1	0	0	0	0	0	0	0	0	0	0	17	0	0
Juillet	— July	11	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Août *	— August *	8	2	0	0	0	0	0	0	0	2 *a*	0	1	8	0	0
Septembre *	— September*	5	0	0	0	0	6 *a*	0	0	0	0	0	1	— *a*	0	0
Octobre	— October	3	5 *a*	0	0	0	0	0	1	1	1	3	1	1	0	0
Octobre *	— October *	31	24 *a*	0	2	0	0	0	0	0	22 *a*	0	0	15	0	0
Novembre	— November	28	44	0	2	0	41 *a*	60	0	0	20	0	1 *b*	10	0	0
Décembre	— December	26	0	0	3	0	0	0	4	1	28	0	0	4	0	0

* Les données pour les semaines du 22-28 mars, 2-8 août, 9–15 août et du 18-24 octobre manquent.
* Data for the following weeks are missing: March 22nd-28th, August 2nd-8th, August 9th-15th, and October 18th-24th.

a Les données sont incomplètes, nombre indéfini de cas supplémentaires officiellement reportés.
a The data are incomplete; indefinite number of additional cases officially reported.

SIERRA-LÉONE — SIERRA LEONE

Population: 1 541 311. R. 24 avril 1921.

ombre de cas de quelques maladies déclarés en Sierra-Léone en 1923. — Number of Cases of Certain Diseases notified in Sierra-Leone in 1923

ource: Rapports du Ministère britannique de Santé. — Reports from British Ministry of Health.

Maladie — Disease		Total 1923	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Juin June	Juill. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Dysenterie	Dysentery	115	3	8	8	16	7	16	5	15	7	13	10	7
Pneumonie	Pneumonia	92	14	11	9	5	6	3	5	6	7	12	2	12
Scarlatine	Scarlet fever	1	0	1	0	0	0	0	0	0	0	0	0	0
Varicelle	Chickenpox	97	19	31	23	8	1	2	2	1	1	5	2	2
Variole	Smallpox	18	0	1	3	8	1	0	1	1	0	0	3	0

D'après les rapports annuels pour 1921 et 1922, 47 cas de variole furent reportés en 1921 et 44 cas en 1922; ces données sont incomplètes.
From annual reports for 1921 and 1922, 47 cases of smallpox were reported in 1921 and 44 cases in 1922; these data are incomplete.

TERRITOIRE DU TANGANYIKA — TANGANYIKA TERRITORY

(Population: 4 109 893. R. 24 avril 1921)

Nombre de cas de maladies à déclaration obligatoire et de décès causés par ces maladies, 1922 et 1923; par périodes de quatre semaines en 1923.
Number of Cases of and Deaths from Notifiable Diseases reported in 1922 and 1923; by four-week periods in 1923.

Source: Rapport annuel du Ministère des Colonies, 1921-1923; Relevé des maladies infectieuses, Service sanitaire, 1923.
Annual Report from the Colonial Office, 1921-1923; Return of Infectious Diseases, Sanitary Division, 1923.

Maladie — Disease			Total 1921	Total 1922	Total 1923	31 déc. 27 jan. Dec. 31 Jan. 27	28 jan. 24 fév. Jan. 28 Feb. 24	25 fév. 24 mars Feb. 25 Mar. 24	25 mars 21 avril Mar. 25 April21	22 avril 19 mai April22 May 19	20 mai 16 juin May 20 June 16	17 juin 14 juill. June 17 July 14	15 juill. 11 août July 15 Aug. 11	12 août 8 sept. Aug. 12 Sept. 8	9 sept. 6 oct. Sept. 9 Oct. 6	7 oct. 3 nov. Oct. 7 Nov. 3	4 nov. 1 déc. Nov. 4 Dec. 1	2-29 déc. 2-29 Dec.
Grippe	Influenza	C.	—	1176	1933	3	128	89	11	0	275	257	146	20	620	208	80	261
		D.	113	37	291	0	16	7	0	0	0	4	0	20	46	115	27	56
Méningite cérébro-spinale	Cerebro-spinal mening.	C.	17	9	101	14	2	2	0	0	0	1	0	49	33	0	0	0
		D.	4	6	89	7	1	1	0	0	0	1	0	46	33	0	0	0
Peste	Plague	C.	—	52	39	7	4	0	0	1	2	0	20	0	0	0	5	0
		D.	163	40	26	6	4	0	0	1	2	0	12	0	0	0	1	0
Variole	Smallpox	C.	1267	390	217	23	22	12	21	5	1	3	24	57	15	21	10	3
		D.	151	46	31	1	1	0	6	0	1	4	2	13	0	1	2	0

Les données pour les périodes de quatre semaines sont provisoires; les totaux annuels sont corrigés.
Data for four-week periods are provisional; annual data are corrected.

PROTECTORAT DE LA TUNISIE — PROTECTORATE OF TUNIS

(Population: 2 093 939. R. 6 mars 1921.)

Nombre de cas de maladies transmissibles constatés en 1923, par mois.
Number of Cases of Communicable Diseases reported in 1923, by months.

Source: Bulletin sanitaire de l'Algérie.

Maladie — Disease		Total	Jan. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Juin June	Juill. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Conjonctivite purulente	Purulent conjunctivitis	1	0	1	0	0	0	0	0	0	0	0	0	0
Coqueluche	Whooping-cough	5	0	0	0	3	1	1	0	0	0	0	0	0
Diphtérie	Diphtheria	203	30	9	19	8	12	14	5	11	17	35	21	22
Dysentérie	Dysentery	78	2	1	1	2	10	6	9	10	19	14	2	2
Encéphalite léthargique	Encephalitis lethargica	2	0	0	0	0	0	0	0	0	1	1	0	0
Fièvre méditerranéenne	Mediterranean fever	69	0	3	0	8	5	4	11	5	15	7	8	3
Fièvre récurrente	Relapsing fever	2	0	0	0	0	0	0	0	0	0	0	2	0
Fièvre typhoïde	Enteric fever	655	14	18	53	16	40	24	46	61	98	102	111	72
Grippe	Influenza	30 *a*	2	0	8 *a*	0	0	0	0	0	0	0	0	20
Méningite cérébro-spinale	Cerebro-spinal meningitis	21	2	8	2	0	1	0	0	3	3	0	1	1
Oreillons	Mumps	33	1	3	0	1	6	1	2	0	3	3	3	10
Paludisme	Malaria	62	3	4	1	1	0	3	15	1	14	6	11	3
Peste	Plague	31	0	0	0	29	0	0	1	0	0	0	1	0
Rage	Rabies	6	0	0	0	0	1	0	1	0	3	0	1	0
Rougeole	Measles	442	11	40 *b*	22	98	62	62	45	23	25	11	11	32
Scarlatine	Scarlet fever	37	6	3	1	1	0	2	4	2	3	4	9	2
Teigne	Favus	6	0	0	0	0	0	0	0	0	0	2	2	2
Trachome	Trachoma	14	0	0	0	0	4	0	0	0	0	4	5	1
Tuberculose	Tuberculosis	359	3	5	3	16	29	42	57	28	43	46	40	47
Typhus exanthém.	Typhus	357	1	13	98	60	76	30	26	14	3	20	4	12
Variole	Smallpox	279	39	26	19	23	17	18	5	37	35	6	13	41

a Ce chiffre ne comprend pas une épidémie signalée (sans nombre de cas). — Does not include an epidemic reported (number of cases not given).
b Pulmonaire. — Pulmonary.

UNION DE L'AFRIQUE DU SUD — UNION OF SOUTH AFRICA

(Population: 7 055 158. E. 1922 *.)

Nombre de cas et de décès dus à la peste, le typhus exanthématique et la variole, 1919-1923; par mois en 1923.
Cases of and Deaths from Plague, Typhus and Smallpox, 1919-1923; by months in 1923.

Source: Rapports annuels du Département de la Santé publique des années 1920, 1921, 1922 et 1923. Rapports mensuels pour les années 1922, 1923.
Annual Reports of the Health Department for 1920, 1921, 1922 and 1923. Monthly Reports for 1922 and 1923.

Maladie — Disease			Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Janv. Jan.	Févr. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Peste	Plague	C.	0	12	33	10	20	0	0	0	0		0	0	0	0	7	4	9
		D.	0	4	16	8	12	0	0	0	0	0	0	0	0	0	7	1	4
Typhus exanth.	Typhus	C.	4828	11276	9157	7922	2922	597	453	203	134	108	137	133	95	321	289	273	179
		D.	1122	1791	1140	966	437	66	27	18	16	21	27	24	22	95	58	25	38
Variole	Smallpox	C.	559	1036	1108	713	285	22	12	24	13	33	33	17	27	40	44	15	5
		D.	a	a	19	23	8	1	2	1	0	1	0	0	0	1	2	0	0

Déclaration de maladies contagieuses (Blancs et indigènes) par les médecins.
Notifications of Infectious Diseases (Whites and Natives) by Medical Practitioners.

Maladie — Disease		Total 1919	Total 1920	Total 1921	Total 1 janv. 30 juin Jan. 1st June 30 1922	Total 1 juil. 1922 30 juin 1923 July 1 1922 June 30 1923	1919 *a* B. W.	1919 *a* I N	1920 B. W.	1920 I N	1921 B. W.	1921 I N	1922 1 janv.—30 juin Jan. 1 June 30 B. W.	1922 I N	1er juillet 1922 30 juin 1923 July 1st 1922 June 30th 1923 B. W.	I N
									b	*b*						
Anthrax	Anthrax	53	75	110	46	50			31	44	17	93	13	33	11	39
Diphtérie	Diphtheria	1036	1110	1014	540	885			877	139	847	167	459	81	771	114
Encéphalite infectieuse	Infective Encephalitis	*a*	25	33	6	13			7	18	12	21	4	2	4	9
Erysipèle	Erysipelas	129	197	167	79	194			146	44	118	49	59	20	142	52
Fièvre de Malte	Malta fever	13	37	27	25	27			27	10	20	7	24	1	16	11
Fièvre puerpérale y compris septicémie puerp.	Puerperal fever including puerperal sepsis	96	195	134	64	136			117	75	92	42	33	31	87	49
Fièvre typh.	Enteric fever	3114	5515	4511	2623	4163			3036	2256	2713	1798	1514	1109	2424	1739
Lèpre	Leprosy	71	115	108	45	87			5	110	16	92	2	43	2	85
Méningite cérébro-spinale	Cerebro-spinal meningitis	21	128	113	58	515			16	112	23	90	7	51	107	408
Morve	Glanders	0	1	0	0	0			0	1	0	0	0	0	0	0
Ophtalmie gonorrhéique, des nouv.-nés	Gonorrhœal Ophthalmia Neonatorum	*a*	10	22	3	12			5	5	18	4	1	2	7	5
		a	52	98	41	82			24	28	57	41	12	29	51	31
Peste	Plague		6	33	6	2				6	7	26	0	6	0	2
Poliomyélite	Poliomyelitis	10	35	33	18	5			26	7	27	6	14	4	2	3
Rage humaine	Rabies	0	1	0	0	0			1	0	0	0	0	0	0	0
Scarlatine	Scarlet fever	2783	1756	920	640	2042			1653	79	854	66	628	12	2000	42
Tuberculose	Tuberculosis	2305	3504	2962	1297	3612			349	2964	439	2523	174	1123	400	3212
Typhus exanth.	Typhus	4803	6992	6257	1851	3762			70	6922	97	6160	33	1818	56	3706
Variole	Smallpox	559	1036	787	269	285			169	866	71	716	83	186	19	266

* Blancs — Whites = 1.550.578; Indigènes — Natives = 5,504,580.
B. = Blancs; I. = Indigènes. — W. = White; N. = Natives.
a Les données n'étaient pas inclues dans les rapports reçus.
a Data not given in the reports available.
b Les données dans ces colonnes ne correspondent pas toujours aux totaux pour 1920 qui ont été pris dans un rapport plus récent.
b Data given in these columns do not always agree with totals for 1920, which have been taken from a more recent report.

ZANZIBAR

Population: 197 000. R. 30 avril 1921.

Nombre de cas et de décès causés par la variole dans les années 1919-1923; décès causés par certaines maladies 1919-1922.
Number of Cases of and Deaths from Smallpox reported from 1919 to 1923; Deaths from certain other Diseases, 1919-1922.

Source: Rapports périodiques du Ministère britannique de Santé, 1923. Rapports annuels du Département de Santé, 1919-1922.
Current reports from the British Ministry of Health, 1923. Annual Reports of Health Department, 1919-1922.

Maladie — Disease			Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	30 déc. Dec. 27 jan. Jan.	28 jan. Jan. 24 fév. Feb.	25 fév. Feb. 24 mars Mar.	25 mars Mar. 21 avril April	22 avril April 19 mai May	20 mai May 16 juin June	17 juin June 14 juill. July	15 juill. July 11 août Aug.	12 août Aug. 8 sept. Sept.	9 sept. Sept. 6 oct. Oct.	7 oct. Oct. 3 nov. Nov.	4 nov. Nov. 1 déc. Dec.	2 déc. Dec. 29 déc Dec.
Variole	Smallpox	C.	4	7	158	167	225	13	6	17	22	28	3	1	6	0	94	32	3	0
		D.	1	1	56	54	2	0	0	0	0	2	0	0	0	0	0	0	0	0

Autres maladies déclarées: — Other diseases declared:

	Dysenterie Dysentery D	Grippe Influenza D.	Fièvre hématurique Blackwater fever D.	Lèpre Leprosy C.	Lèpre Leprosy D.	Méningite cérébro-spin. Cerebro-spin. meningitis D.	Pneumonie Pneumonia D.	Tétanos Tetanus D.
1919	14	13		3	12			1
1920	9	1	3	17	7	1	25	2
1921	1	0	3	13	12	0	24	2
1922	2	5	3	13	8	3	46	1

Pas de cas de choléra, de fièvre jaune ou de peste, 1919-1923. — No case of cholera, yellow fever or plague, 1919-1923.

AMÉRIQUE — AMERICA

BRÉSIL — BRAZIL

Nombre de décès constatés dans le District Fédéral, l'Etat de Sao Paulo, et dans les villes de Natal et de Victoria, 1919-1923.
Number of Deaths reported in the Federal District, State of Sao Paulo, and towns of Natal and Victoria, 1919 1923.

RIO DE JANEIRO (District Fédéral). (Population: 1 309 358. E. juin 1923)

Source: Rapports spéciaux du Département de Santé publique — Special Reports from the Department of Public Health.

Cause de décès — Cause of death		Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Peste	Plague	1	1	0	1	0												
Anthrax	Anthrax	0				1	1	0	0	0	0	0	0	0	0	0	0	0
Béri-béri	Beri-beri	2	3	2	0													
Coqueluche	Whooping cough	395	189	45	261	546	40	43	41	38	31	45	34	36	49	76	57	56
Diphtérie	Diphtheria	108	62	60	94	49	0	5	6	3	6	6	5	6	4	0	5	3
Dysenterie	Dysentery	287	209	247	383	275	17	19	27	28	31	14	21	20	16	17	29	36
Encéphalite léth.	Encephalitis leth.	—	17	7	7	4	0	0	0	0	1	0	1	1	0	0	0	1
Erysipèle	Erysipelas					61	4	8	10	6	7	1	8	2	6	3	4	2
Fièvre jaune	Yellow fever	2	0	*a* 1	0	0												
Fièvre typhoïde et paratyphoïde	Enteric fever	125	128	132	152	131	8	8	12	7	12	5	5	7	15	19	15	18
Granulome ulcéreux des org. génitaux	Venereal granuloma			3	1													
Grippe	Influenza	704	421	777	911	1079	57	105	171	157	119	83	89	68	57	61	50	62
Infect. cryptogén	Cryptogenic infect.			1	5													
Leichmaniase	Leishmaniasis	1	—	2	2	1	0	0	0	0	0	0	0	0	0	1	0	0
Lèpre	Leprosy	29	28	44	40	42	5	3	5	4	0	1	2	3	3	4	5	7
Maladie de Chagas	Chagas disease		1			1	0	1	0	0	0	0	0	0	0	0	0	0
Méningite cérébrospinale	Cerebro-spinal meningitis	4	110	95	119	46	3	5	5	4	5	8	4	0	5	5	1	1
Mycose	Mycosis	3	5	4	5	3	0	0	0	0	0	3	0	0	0	0	0	0
Oreillons	Mumps	3	1	—	1	0												
Paludisme	Malaria	522	539	360	358	417	32	38	56	60	50	48	32	18	22	15	23	23
Poliomyélite aiguë	Acute poliomyelitis	3	2	2	5	4	0	0	0	0	0	0	0	0	1	0	1	2
Rage	Rabies	8	6	3	6	4	0	0	3	0	0	0	0	0	1	0	0	0
Rougeole	Measles	659	65	95	653	173	42	19	10	7	11	8	14	11	15	14	13	9
Rubéole	German measles	1																
Scarlatine	Scarlet fever	2	4	2	4	0												
Trachome	Trachoma	—	0	1	0													
Tuberculose	Tuberculosis	4409	4608	4641	4483	4183	401	337	348	354	375	314	369	312	304	362	348	359
Varicelle	Varicella	—	—	0	8	2	0	0	0	0	0	0	1	0	0	1	0	0
Variole	Smallpox	305	99	49	117	38	11	10	7	1	2	0	1	1	3	1	1	0
Gonorrhée	Gonorrhœa				7	7	2	1	1	0	0	1	0	0	1	0	1	0

a Le diagnostic est contesté. — The diagnosis is contested.

Cause de décès. — Causes of death		SAO-PAULO (Etat—State) Population: 4 819 357. E. 1922.					NATAL (ville — town) Population: 33 885. E. 1923.					VICTORIA (ville — town) Population: 24 252. E. 1923.				
		1919	1920	1921	1922	1923	1919	1920	1921	1922	1923 *b*	1919	1920	1921	1922	1923
Choléra asiat.	Asiatic cholera	0	0	0	0											
Peste	Plague	1	15	1	1							0	0	0	0	0
Choléra nostras	Cholera nostras	51	62	—	57		0	2	24	1		0	0	0	0	0
Coqueluche	Whoop. cough	341	686	562	322						1	8	1	0	0	0
Diphtérie	Diphtheria	240	360	270	302						13	0	0	0	5	1
Dysenterie	Dysentery	483	627	822	852			1	1	1		1	0	2	0	0
Encéphalite léth.	Encephal. leth.	—	—	—	13		20	12	13	20	21	5	7	7	6	1
Erysipèle	Erysipelas	61	61	61	50											
Fièvre jaune	Yellow fever	0	0	0	0		3	0	1	0	0	0	0	0	0	0
Fièvre typhoïde et paratyph.	Enteric fever	412	663	821	803		10	9	17	17	17	0	0	0	0	0
Grippe	Influenza	7754	808	4126	1452		59	6	13	22	15	8	4	1	13	15
Infect. purulente et septicémie	Purulent infec. and septic.											10	4	17	18	14
Lèpre	Leprosy	123	157	165	150		—	—	—	1	1	9	0	10	5	10
Méningite cérébrospinale	Cerebro-spinal meningitis	—	—	—	110							0	0	0	0	0
Mycose	Mycosis	1	9	—	1											
Paludisme	Malaria	368	814	475	794		17	2	8	38	12	32	47	26	42	43
Rage	Rabies	10	5	5	3							0	0	0	10	0
Rougeole	Measles	246	914	699	371		6	3	—	5	—	0	0	0	3	0
Scarlatine	Scarlet fever	137	151	31	8							0	0	0	0	0
Septicémie puerpérale	Puerperal septicæmia											0	2	2	1	1
Stomatite gangréneuse	Gangrenous stomatite											—	0	0	1	0
Tétanos	Tetanus	696	930	925	897							0	1	5	4	0
Tuberculose	Tuberculosis	2640	2760	3175	3284		46	42	40	64	48	95	103	118	122	120
Typhus exanth.	Typhus	2	2	—	1	—										
Variole	Smallpox	7	416	29	7		21	58	6	0	0	1	0	0	0	0
Syphilis	Syphilis	386	450	492	486							3	4	13	0	9
Autres maladies contagieuses	Other contagious diseases	27	364	21	6											

b Les données pour le mois de décembre ne sont pas incluses. — Data for December are not included

CUBA

(Population: 3 143 210. E. 31 déc. 1923.)

Nombre de cas de maladies à déclaration obligatoire déclarés en 1923, par périodes de dix jours.

Number of Cases of Notifiable Diseases reported in 1923, by 10-day periods.

Source: Boletin Decenal Epidemiologico Sanitario.

Décade finissant: / Decade ending:		Diphtérie / Diphtheria	Fièvre typh. et paratyph. / Enteric fever	Méningite cér.-spin. / Cer.-spin. mening.	Paludisme / Malaria	Poliomyélite / Poliomyelitis	Rougeole / Measles	Scarlatine / Scarlet fever	Tétanos infantile / Infantile tetanus	Varicelle / Chicken-pox	Variole / Smallpox
Total 1923		315	*a* 2740	6	4847	3	92	72	19 *b*	800	12
Janvier — January	10	13	59	0	163	0	1	3	0	40	3
	20	11	34	0	152	0	5	1	0	17	3
	31	4	51	0	144	0	4	4	0	31	5
Février — February	10	9	62	0	120	0	2	4	1	78	1
	20	11	42	0	112	1	4	3	0	58	0
	28	11	39	0	79	0	0	4	1	39	0
Mars — March	10	9	61	0	101	0	2	2	0	81	0
	20	7	53	3	61	0	2	3	1	46	0
	31	17	53	1	68	0	9	5	0	64	0
Avril — April	10	14	88	1	76	0	5	2	1	64	0
	20	7	84	0	101	0	0	1	0	64	0
	30	8	70	1	103	1	3	2	0	24	0
Mai — May	10	4	63	0	86	0	0	1	0	24	0
	20	2	73	0	92	0	0	1	1	18	0
	31	9	102	0	81	0	3	3	0	17	0
Juin — June	10	4	98	0	93	0	2	1	3	16	0
	20	7	109	0	127	0	5	2	0	29	0
	30	7	108	0	240	0	7	1	1	20	0
Juillet — July	10	3	79	0	160	0	2	1	0	2	0
	20	10	139	0	166	0	4	1	1	16	0
	31	8	148	0	146	0	3	2	1	6	0
Août — August	10	7	144	0	166	0	2	1	0	0	0
	20	9	129	0	106	0	2	1	2	6	0
	31	3	106	0	114	0	3	1	0	3	0
Septembre — September	10	6	93	0	91	0	0	0	2	0	0
	20	12	109	0	128	0	0	1	0	0	0
	30	16	90	0	92	0	2	0	0	1	0
Octobre — October	10	9	96	0	40	0	5	1	0	6	0
	20	5	62	0	113	0	4	1	1	2	0
	31	10	44	0	191	0	2	7	0	0	0
Novembre — November	10	8	54	0	255	0	5	0	*b*	5	0
	20	8	43	0	250	0	1	3	0	2	0
	30	10	55	0	238	1	1	3	1	3	0
Décembre — December	10	9	54	0	201	0	0	1	0	4	0
	20	13	23	0	214	0	0	3	0	10	0
	31	15	23	0	177	0	2	2	2	4	0

a Comprenant 2.375 cas de fièvre typhoïde et 365 cas de fièvre paratyphoïde. — Including 2,375 cases of typhoid fever and 365 cases of paratyphoid fever.

b Manquent les renseignements relatifs aux dix jours du 1er au 10 novembre.

b Data not received for the 10-day period November 1-10.

Pas de cas de choléra asiatique, fièvre jaune, ictère grave, morve, peste ou de typhus exanthématique.

No case of Asiatic cholera, yellow fever, icterus gravis, glanders, plague or typhus.

La Havane — Havana

(Population: 432 353. E. 31 déc. 1923.)

Nombre de cas de maladies à déclaration obligatoire et de décès dus à ces maladies, 1919-1922.

Number of Cases of and Deaths from Notifiable Diseases, 1919-1922.

Source: Sanidad y Beneficencia, Boletin Oficial, Edicion Mensual, 1919-1922.
Boletin Decenal Epidemiologico Sanitario, 1923.

Maladie — Disease		1919		1920		1921		1922		1923	
		C.	D.	C.	D.	C.	D.	C.	D.	C.	D. *a*
Choléra	Cholera	0	0	0	0	0	0	0	0	0	
Diphtérie	Diphtheria	79	10	78	16	64	17	95	13	130	
Fièvre jaune	Yellow fever	0	0	0	0	5	0	0	0	0	
Fièvre paratyphoïde	Paratyphoid fever	—	—	0	0	8	1	40	6	20	
Fièvre typhoïde	Typhoid fever	609	125	771	153	410	112	639	132	453	
Méningite cérébro-spinale	Cerebro-spinal meningitis	2	1	39	16	19	11	1	2	6	
Paludisme	Malaria	1128	19	1142	20	1509	23	934	35	1176	
Peste	Plague	0	0	0	0	0	0	1	0	0	
Poliomyélite	Poliomyelitis	0	0	0	0	3	1	1	0	1	
Rougeole	Measles	82	1	885	46	147	4	11	1	77	
Scarlatine	Scarlet fever	25	1	109	22	74	3	130	0	44	
Tétanos infantile	Infantile tetanus	0	0	0	0	3	3	1 0	0	1	
Typhus exanthém.	Typhus	0	0	0	0	0	0	0	0	0	
Varicelle	Chickenpox	17	0	142	0	122	1	217	1	173	
Variole	Smallpox	55	2	15	1	47	0	34	1	0	

a Le rapport n'est pas parvenu. — Report has not been received.

ÉQUATEUR, VILLE DE GUAYAQUIL — ECUADOR, CITY OF GUAYAQUIL

Population: 100 000. E. 1921.

Nombre de cas de peste et de vàriole et de décès causés par ces maladies déclarés à Guayaquil.
Number of Cases of and Deaths from Plague and Smallpox reported in Guayaquil.

Source: Boletín Sanitario (et—and) Informe, año 1922, del Director General de Sanidad Pública.

Maladie — Disease			Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Guayaquil																			
Peste	Plague	C.	66	187	270	56	94	4	14	12	1	1	0	2	0	8	4	7	41
		D.	22	55	95	19	31	1	4	5	2	1	0	2	0	1	1	3	11
Variole	Smallpox	C.				58	18	9	2	1	2	3	0	0	0	0	0	0	1
		D.				0	0												
a Autres localités. — *a* Other Localities.																			
Peste	Plague	C.					32	1	0	3	0	0	0	3	13	0	11	0	1
		D.					11	0	0	1	0	0	0	3	2	0	5	0	0

1923, variole, autres localités: Alansi 3 cas, 0 décès; Babahoyo 1 cas, 0 décès; Bahia 4 cas, 0 décès; Esmeraldas 11 cas, 0 décès; Jipijapa 28 cas, 0 décès; Montecristi 55 cas, 2 décès; Portoviejo 10 cas, 0 décès; Riobamba 1 cas, 1 décès; Santa Ana 27 cas, 2 décès.

1923, smallpox, other localities: Alansi 3 cases, no death; Babahoyo 1 case, no death; Bahia 4 cases, no death; Esmeraldas 11 cases, no death; Jipijapa 28 cases, no death; Montecristi 55 cases, 2 deaths; Portoviejo 10 cases, no death; Riobamba 1 case, 1 death; Santa Ana 27 cases, 2 deaths.

a Ambato, Chougon, Guamote, Jipijapa, Nobol, Sabanilla, Santa Ana, Vino del Milagro.

ÉTATS-UNIS — UNITED STATES

(Population: 105 710 620. R. 1er janv. 1920.)

Nombre de cas de certaines maladies transmissibles déclarés en 1919-1923.
Number of Cases of Certain Communicable Diseases reported in 1919-1923.

Source: United States Public Health Reports.

Maladie — Disease		Nombre d'Etats notifiant Number of States reporting	Population R. 1920 en milliers in thousands	1919	1920	1921	1922	1923
Angine septique	Septic sore throat	11	37 605	1 822	3 097	2 589	1 975	3 323
Anthrax	Anthrax	6	29 104	69	101	47	36	38
Dengue	Dengue	2	3 864	34	171	388	10 138	92
Diphtérie	Diphtheria	36 *	89 752	127 158	143 350	196 618	159 509	134 575
Fièvre des montagnes rocheuses	Rocky Mountains fever	4	4 954	22	54	60	150	80
Fièvre typhoïde	Typhoid fever	35 *	87 348	36 479	33 825	42 340	30 787	28 366
Grippe	Influenza	23 *	54 296	592 270	1 505 224	35 771	274 411	303 341
Méningite cérébro-spinale	Cerebro-spinal meningitis	22 *	62 014	2 034	2 012	1 816	1 451	1 283
Paludisme	Malaria	16	37 742	134 368	143 003	139 006	120 517	115 217
Pneumonie	Pneumonia	8	32 168	58 494	109 745	61 085	83 076	83 607
Poliomyélite	Poliomyelitis	29 *	77 682	1 790	2 225	5 880	2 034	2 912
Rougeole	Measles	36 *	89 752	177 605	456 676	254 167	256 326	694 523
Scarlatine	Scarlet fever	36 *	89 752	103 477	154 758	181 927	148 617	163 954
Tuberculose, toutes formes	Tuberculosis, all forms	13 *	33 043	61 371	56 260	55 788	56 663	54 129
Typhus exanthém.	Typhus	2	13 812	13	10	47	17	19
Variole	Smallpox	36 *	89 752	55 089	91 565	91 611	28 126	53 921

* Y compris le district de Colombie. — Including the District of Columbia.

ÉTATS-UNIS — UNITED STATES

(Population: 110 663 502. E. 1er juillet 1923.)

Nombre de cas de certaines maladies transmissibles déclarés en 1923, par mois.
Number of Cases of Certain Communicable Diseases reported in 1923, by months.

Source: United States Public Health Reports.

Maladie — Disease		Nombre d'Etats notifiant Number of States reporting	Population E. 1923 en milliers in thousands	Total	Jan. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Juin June	Juill. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Angine septique	Septic sore throat	24	55739	1910	236	236	168	91	162	116	103	91	117	145	245	200
Anthrax	Anthrax	20	66575	107	4	5	8	13	6	18	7	12	12	7	8	7
Coqueluche	Whooping-cough	47*	107724	161059	12705	13609	16757	18320	16805	15531	14751	11009	9096	8832	11002	12642
Dengue	Dengue	7	16866	2957	1381	162	132	84	48	41	50	111	205	511	171	61
Diphtérie	Diphtheria	47*	107724	144124	16697	10790	10684	8754	8358	7245	6385	7438	11313	19168	19701	17591
Dysenterie	Dysentery	27	65225	16954	327	284	372	470	1815	4729	3989	2181	1292	712	425	358
Encéphal. léth.	Encephal. leth.	31*	73809	2387	207	539	603	273	141	103	104	105	62	92	85	70
Fièvre des montagnes rocheuses	Rocky Mountains fever	9	8804	107	0	0	4	19	32	31	12	3	1	1	3	1
Fièvre paratyph.	Paratyph. fever	18	47136	286	12	17	13	17	18	26	31	42	33	25	26	26
Fièvre typhoïde	Typhoid fever	46*	105256	32500	1250	837	1012	1158	1439	2445	4231	5904	5398	4341	2651	1834
Grippe	Influenza	45*	95938	363663	144083	117360	61655	26225	4765	1026	571	821	1168	2464	4242	5283
Lèpre	Leprosy	14*	35820	54	2	3	3	5	7	8	4	3	6	7	5	1
Méningite cérébro-spinale	Cerebro-spinal meningitis	47*	107724	1924	171	192	212	192	163	150	130	135	114	144	181	140
Paludisme	Malaria	29	85704	137543	4125	3922	4720	7427	9453	12306	18952	24613	22795	15771	8319	5140
Pellagre	Pellagra	21	58655	7427	230	244	344	540	971	1387	1249	841	682	413	299	227
Pneumonie	Pneumonia	42	99339	118030	19176	24226	19445	12563	8860	4662	2645	2423	2700	4543	7057	9730
Poliomyélite	Poliomyelitis	45*	107417	3285	83	67	61	54	80	86	312	679	665	704	327	167
Rougeole	Measles	47*	107724	744598	61704	72919	97627	130553	150838	89469	27035	9097	6679	15323	29835	53519
Scarlatine	Scarlet fever	47*	107724	173349	21113	18311	19136	17069	16041	10238	5322	5032	7699	14234	18344	20810
Trachome	Trachoma	29	75654	1564	75	76	162	155	215	82	75	67	123	129	106	299
Tuberculose pulm.	Pulm. tuberculosis	4	6946	3872	382	314	407	312	355	329	344	309	288	295	258	279
Tuberculose, toutes formes	Tuberculosis, all forms	44*	102568	119534	9901	9154	12390	10032	12154	10892	10520	9675	8466	9362	8690	8298
Typhus exanth.	Typhus	11*	40392	54	1	0	1	1	1	3	4	8	7	12	10	6
Variole	Smallpox	47*	107724	29968	3720	2885	3037	3432	3361	2243	1512	856	715	1418	2845	3944

* Y compris le district de Colombie. — Including the District of Columbia.

GRENADE — GRENADA

(Population: 68 086. E. 31 déc. 1923)

Nombre de cas de quelques maladies importantes et de décès causés par ces maladies en 1919-1923; par mois en 1923.
Number of Cases of and Deaths from Certain Important Diseases, 1919-1923; by months in 1923.

Source: Rapports du Ministère britannique de Santé, 1923. — Reports from British Ministry of Health, 1923. Medical Report on the Charitable Institutions, etc., 1922.

Maladie — Disease			Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Dysenterie [1]	Dysentery [1]	C.	733	72	54	59	28	55	54	58	53	92	51	65	92
Grippe	Influenza	C.	628	56	42	51	20	56	51	90	66	71	52	32	41
Pneumonie	Pneumonia	C.	79	9	8	3	1	7	19	11	6	7	5	2	1
		D.	3	0	2	0	0	0	0	0	0	0	0	1	0
Poliomyélite aiguë	Acute poliomyelitis	C.	1	0	0	0	0	0	0	0	0	0	0	1	0
		D.	1	0	0	0	0	0	0	0	0	0	0	1	0

[1] La dysenterie a causé 99 décès en 1920; 109 décès en 1921; 83 décès en 1922. — Dysentery caused 99 deaths in 1920, 109 in 1921, 83 in 1922.

Autres maladies déclarées: — Other diseases notified:

	Fièvre typhoïde Enteric fever		Paludisme Malaria	Pellagre Pellagra	Tétanos Tetanus	Tuberculose pulmonaire Pulmonary tuberculosis	
	C.	D.	D.	D.	D.	C.	D.
1919	—	—	—	0	—	80	65
1920	174	37	77	2	15	61	46
1921	88	12	69	0	13	35	50
1922	144	24	83	1	9	44	37

GUYANE BRITANNIQUE — BRITISH GUIANA

Population: 297 691. R. avril 1921.

Nombre de cas de maladies à déclaration obligatoire et de décès causés par ces maladies déclarés en 1921-1923; par périodes de quatre semaines en 1923.

Number of Cases of and Deaths from Notifiable Diseases reported 1921-1923; by four-week periods in 1923.

Source: Rapports du Ministère britannique de Santé. — Reports from British Ministry of Health.

Période de quatre semaines finissant: Four-week period ending:			Diphtérie Diphtheria	Dysenterie Dysentery		Fièvre typhoïde et paratyphoïde Enteric fever		Grippe Influenza		Méningite cérébrospin. Cerebrospin. meningitis		Pneumonie Pneumonia		Varicelle Chicken-pox	Variole Small pox
			C.*	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.*	C.*
Total		1919				525	112								0
»		1920				795	138								
»		1921				489	118								0
»		1922	27			461	92			2				68	0
»		1923	18	1111	89	384	63	8473	77	2	2	920	305	47	1
Janvier	—	January	27	0	152	11	29	5	65	0	1	1	72	31	1	1
Février	—	February	24	0	226	18	51	6	81	2	0	0	83	26	4	0
Mars	—	March	24	8	178	14	60	4	37	0	0	0	83	38	7	0
Avril	—	April	21	*a* 2	*a* 65	*a* 4	*a* 32	*a* 8	*a* 26	*a* 0	*a* 0	*a* 0	*a* 35	*a* 12	*a* 1	*a* 0
Mai	—	May	19	4	57	2	31	11	26	0	1	1	53	19	1	0
Juin	—	June	16	1	45	8	22	3	294	6	0	0	66	18	2	0
Juillet	—	July	14	1	42	5	21	3	1788	48	0	0	148	30	1	0
Août	—	August	11	1	41	1	21	2	792	18	0	0	104	43	2	0
Septembre	—	September	8	0	43	3	12	1	112	1	0	0	37	9	3	0
Octobre	—	October	6	0	47	2	14	3	58	1	0	0	40	14	9	0
Novembre	—	November	3	0	56	6	21	4	17	1	0	0	41	15	11	0
Décembre	—	December	1	0	63	6	34	6	4	0	0	0	65	21	0	0
			31	1	96	9	36	7	173	0	0	0	93	29	5	0

a Données pour trois semaines du 25 mars au 14 avril. — *a* Data given for three weeks, March 25th-April 14th.

* Pas de décès de diphtérie, de varicelle ou de variole en 1923. — * No death from diphtheria, chickenpox or smallpox in 1923.

Pas de cas de choléra asiatique, fièvre jaune, peste, ou de typhus exanthématique, 1921-1923. — No case of asiatic cholera, yellow fever plague or typhus, 1921-1923.

HAWAÏ — HAWAII

(Population: 275 688. E. 31 déc. 1922)

Nombre de cas de maladies à déclaration obligatoire constatés en 1919-1923; par mois en 1923.

Number of Cases of Notifiable Diseases reported in 1919-1923; by months in 1923.

Source: Public Health Reports des Etats-Unis. — United States Public Health Reports.

Maladie — Disease		Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Peste [1]	Plague [1]	7	1	3	6	1	0	0	0	0	0	0	0	0	1	0	0	0
Ankylostomiase	Ankylostomiasis	—	—	—	—	6	0	0	0	0	4	0	0	0	0	2	0	—
Conjonctivite follicul.	Follic. conjunctiv.	—	—	—	—	47	—	—	—	—	—	—	—	1	—	—	46	0
Coqueluche	Whooping-cough	—	—	—	340	594	74	31	77	242	82	29	14	4	7	9	8	17
Dengue	Dengue	2	*a* 1	1		1	0	0	0	0	0	0	0	0	0	0	0	1
Diphtérie	Diphtheria	154	125	186	235	186	19	18	14	16	11	13	24	8	11	20	15	17
Dysenterie	Dysentery					10	1	1	1	2	0	1	1	0	2	1	0	0
Fièvre typhoïde et paratyphoïde	Enteric fever	173	178	230	183	176	13	17	19	13	12	13	17	22	15	17	6	12
Grippe	Influenza	12292	17843	786	788	2455	32	77	27	51	938	490	154	205	134	113	121	113
Lèpre	Leprosy					64	5	5	3	7	7	8	4	5	5	5	5	5
Méningite cérébro-spinale	Cerebro-spinal meningitis	8	*a* 5	21	17	13	1	0	3	2	0	0	0	1	0	4	1	1
Poliomyélite	Poliomyelitis			3	*a* 1	10	2	4	1	2	0	0	0	0	0	1	0	0
Rougeole	Measles	135	631	358	1388	1145	362	265	288	93	43	27	11	9	13	9	12	13
Scarlatine	Scarlet fever	21	17	21	32	21	0	0	3	3	2	1	6	1	0	2	1	2
Tétanos	Tetanus					24	4	3	3	0	5	0	0	3	1	0	2	3
Trachome	Trachoma					397	6	6	12	3	14	1	0	3	7	206	90	49
Tuberculose, toutes formes	Tuberculosis all forms	904	1029	955	901	990	68	92	81	95	98	84	87	58	83	93	89	62
Varicelle	Chickenpox				128	114	9	20	15	13	16	13	6	2	4	5	7	4
Variole	Smallpox			4	2	1	0	0	0	1	0	0	0	0	0	0	0	0

Tuberculose pulmonaire: 965 cas en 1920, 869 cas en 1921 et 778 cas en 1922.
Pulmonary tuberculosis: 965 cases in 1920, 869 cases in 1921 and 778 cases in 1922.

a Décès, le nombre des cas n'est pas reporté. — Deaths, number of cases not reported.

[1] Les décès signalés sont: 1919, 5 décès; 1920, 2 décès; 1921, 2 décès; 1922, 12 décès; 1923, 1 décès.
[1] Deaths reported were as follows: 1919, 5; 1920, 2; 1921, 2; 1922, 12: 1923, 1.

ONTARIO, CANADA

(Population: 2 981 182. E. 1923.)

Nombres de cas de maladies transmissibles et de décès dus à ces maladies constatés en 1919-1923; par mois en 1923.
Number of Cases of and Deaths from communicable Diseases reported in 1919-1923; by months in 1923.

Source: Rapport spécial, 1919 et 1920; rapport annuel du « Provincial Board of Health », 1921 et 1922; « U.S. Public Health Reports », 1923.
Special Report, 1919 and 1920; Annual Report, Provincial Board of Health, 1921 and 1922; U.S. Public Health Reports, 1923.

Maladie — Disease			Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Coqueluche	Whooping cough	C.	1163	2042	2307	1691	3205	376	402	432	286	142	199	208	197	230	185	369	179
		D.	78	210	131	90	181	14	30	24	18	16	19	20	13	8	7	6	6
Diphtérie	Diphtheria	C.	4261	5940	6313	3529	2935	236	156	224	170	165	203	225	194	245	286	374	457
		D.	444	654	525	341	244	25	21	29	21	14	22	24	12	17	13	22	24
Fièvre typhoïde	Enteric fever	C.	492	713	725	576	1665	59	27	557	338	89	38	58	114	131	137	68	49
		D.	145	182	184	127	212	10	4	22	54	24	11	8	14	25	16	13	11
Grippe	Influenza	D.	4735	2411	159	375	874	39	335	317	84	47	13	7	—	7	9	7	9
Méningite cérébro-spinale	Cerebro-spinal meningitis	C.	131	77	79	71	64	6	11	12	13	9	3	5	—	2	—	2	1
		D.	99	67	66	64	59	5	9	10	11	8	3	3	8	1	—	—	1
Pneumonie (primaire et grippale)	Pneumonia (primary and influenzal)	C.	—	3482	2325	2559	3166	380	839	606	354	262	150	47	87	95	90	128	128
Poliomyélite	Poliomyelitis	C.	49	37	81	205	19	2	2	—	4	—	—	2	—	6	—	1	2
		D.	8	14	20	25	10	1	2	—	3	—	—	1	—	2	—	—	1
Rougeole	Measles	C.	1988	15423	2851	8950	10843	331	703	1127	1148	2359	2149	1412	256	95	208	293	762
		D.	21	210	40	40	62	4	7	—	7	14	14	11	3	—	—	—	2
Scarlatine	Scarlet fever	C.	3749	5130	4564	3950	5011	368	309	343	329	397	280	243	215	270	517	680	1060
		D.	80	150	126	111	131	10	13	17	11	7	20	4	6	6	8	11	18
Tuberculose	Tuberculosis]	C.	2234	2259	2286	2078	2120	169	173	187	173	221	188	188	183	169	187	116	166
		D.*	1722	1622	1500	1442	1315	117	137	128	118	118	147	108	135	74	90	58	85
Variole	Smallpox	C.	3049	5639	3777	977	335	43	23	26	29	17	13	14	9	29	23	58	51
		D.	9	33	18	3	—	—	—	—	—	—	—	—	—	—	—	—	—
Chancre mou	Soft chancre	C.	59	82	61	39	43												
Gonorrhée	Gonorrhoea	C.	1757	2158	2584	2270	1992												
Syphilis	Syphilis	C.	1213	1740	2477	2136	1699												

* Seulement le 75 % des décès sont notifiés. — Only 75 per cent. of deaths reported.

PÉROU — PERU

(Population: 5 000 000. E. 1918)

Mortalité par Cause à Lima et à Callao, Pérou, en 1923. — Deaths by Cause in Lima and in Callao, Peru, in 1923.

Source: Rapport du Département de Santé publique. — Report from Public Health Department.

Cause de décès	Lima	Callao	Cause of Death	Lima	Callao
Coqueluche	66	26	Whooping cough	66	26
Diphtérie	15	2	Diphtheria	15	2
Fièvre typhoïde	71	19	Enteric fever	71	19
Grippe	125	43	Influenza	125	43
Paludisme	97	26	Malaria	97	26
Peste	63	9	Plague	63	9
Rougeole	7	0	Measles	7	0
Scarlatine	0	0	Scarlet fever	0	0
Septicémie puerpérale	29	5	Puerperal septicaemia	29	5
Tuberculose pulmonaire	801	329	Pulmonary tuberculosis	801	329
Tuberculose, autres formes	141	54	Tuberculosis, other forms	141	54
Typhus exanthématique	0	0	Typhus	0	0
Variole	5	0	Smallpox	5	0
Entérite, au-dessous d'un an	491	149	Enteritis, under 1 year	491	149
» 1 à 2 ans	147	51	» 1 to 2 years	147	51
Autres causes	2779	899	Other causes	2779	899
Total	4837	1612	Total	4837	1612
Population: Lima	183.404		Population: Lima	183,404	
Callao	56.838		Callao	56,838	

Nombre de cas et de décès dus à la peste constatés au Pérou; par mois en 1923.
Number of Cases of and Deaths from plague reported in Peru; by months in 1923.

		Total	Jan. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec
Peste [1]	Plague [1]													
cas	cases	870	205	150	128	136	67	75	29	11	13	16	25	15
décès	deaths	408	85	72	55	62	24	49	15	5	8	8	19	6

[1] Les chiffres suivants, relatifs à la peste au Pérou, sont extraits des rapports d'hygiène publique des Etats-Unis: 1919, 654 cas, 340 décès; 1920, 758 cas, 392 décès; 1921, 514 cas, 253 décès (pas de renseignements sur le mois de mai et sur la période allant du 16 juillet au 31 août); 1922, 775 cas, 346 décès.

[1] The following data on plague in Peru are taken from United States Public Health Reports: 1919, 654 cases, 340 deaths; 1920, 758 cases 392 deaths; 1921, 514 cases, 253 deaths (no data for May 1st to 31st and July 16th to August 31st); 1922, 775 cases, 346 deaths.

ZONE DU CANAL DU PANAMA ET VILLES DE PANAMA ET COLON
PANAMA ZONE, CITIES OF PANAMA AND COLON

(Population: 122 559. E. 1922)

Nombre de cas de maladies à déclaration obligatoire déclarés en 1921, 1922 et 1923; par mois en 1923.
Number of Cases of Notifiable Diseases reported in 1921, 1922 and 1923; by months in 1923.

Source: Rapports mensuels du Médecin-chef du Service sanitaire.— Monthly Reports from Chief Health Officer.

Maladie — Disease		Total 1921	Total 1922	Total 1923	Jan.	Fév.	Mars	Avril	Mai	Juin	Juil.	Août	Sept.	Oct.	Nov.	Déc.
Angine de Vincent	Vincent's Angine	3	0	3	0	0	0	0	0	0	0	0	0	0	0	3
Ankylostomiase	Ankylostom.	13	584	624	67	53	44	56	28	47	23	75	72	50	68	41
Coqueluche	Whoop. cough	271	15	73	2	0	0	5	0	4	4	4	4	6	7	37
Dengue	Dengue	2	1	2	0	0	0	0	0	0	1	0	1	0	0	0
Diphtérie	Diphtheria	136	174	99	21	13	14	4	9	8	8	11	4	3	3	1
Dysenterie	Dysentery	26	55	66	4	6	4	3	5	8	3	5	4	8	7	9
Fièvre récurr.	Relaps. fever	7	7	2	0	0	0	0	1	1	0	0	0	0	0	0
Fièvre typh. et paratyph.	Enteric fever	36	31	24	1	0	0	0	7	5	3	0	1	1	3	3
Lèpre	Leprosy	11	10	9	0	0	0	0	7	1	0	1	0	0	0	0
Méningite	Meningitis	5	15	12	0	1	2	4	2	0	0	0	0	1	1	1
Oreillons	Mumps	374	27	21	1	2	2	1	3	8	3	0	1	0	0	0
Paludisme	Malaria	1399	1561	1578	208	143	102	47	96	190	245	162	140	84	91	70
Pian	Yaws	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0
Pneumonie	Pneumonia	223	180	240	16	9	10	12	20	14	16	3	22	33	41	44
Poliomyélite	Poliomyelitis	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Rougeole	Measles	228	79	353	6	23	39	12	10	7	16	45	33	38	62	62
Scarlatine	Scarlet fever	58	24	6	1	0	1	0	1	1	0	0	0	0	2	0
Trachome	Trachoma	1	1	3	0	0	1	0	0	1	0	1	0	0	0	0
Tuberculose	Tuberculosis	294	257	376	40	21	34	16	42	29	33	39	26	30	38	28
Varicelle	Chickenpox	136	159	245	19	18	45	33	15	21	17	20	12	18	17	10
Variole	Smallpox	215	14	0	0	0	0	0	0	0	0	0	0	0	0	0

Nombre de décès dus à quelques maladies, déclarés dans la zone du Canal de Panama et dans les villes de Panama et de Colon, 1919-1922.
Deaths from Certain Causes reported in the Panama Canal Zone and the Cities of Panama and Colon, 1919-1922.

Source: Report of the Health Department of the Panama Canal, 1919, 1920, 1921, 1922.

Cause de décès — Cause of death		1919	1920	1921	1922	Cause de décès. — Cause of death		1919	1920	1921	1922
Béri-beri	Beri-beri	2	1	2	2	Paludisme	Malaria	18	9	19	18
Coqueluche	Whooping cough	9	2	2	1	Pellagre	Pellagra	11	7	14	18
Diphtérie	Diphtheria	10	7	6	9	Poliomyélite	Poliomyelitis	0	0	1	0
Dysenterie	Dysentery	13	10	17	13	Pneumonie	Pneumonia	260	216	275	212
Fièvre récurrente	Relapsing fever	0	0	0	0	Rougeole	Measles	1	1	3	0
Fièvre typhoïde	Enteric fever	5	6	6	5	Scarlatine	Scarlet fever	0	1	2	0
Grippe	Influenza	4	62	20	3	Tétanos	Tetanus	2	3	5	4
Lèpre	Leprosy	2	6	0	5	Tuberculose, toutes formes	Tuberculosis all forms	364	343	308	329
Méningite cérébro-spinale	Cerebro-spinal meningitis	1	5	0	2	Variole	Smallpox	0	0	2	0

PORTO-RICO

(Population: 1 355 986. E. 31 déc. 1922)

Nombre de cas de maladies à déclaration obligatoire constatés en 1919-1923; par mois en 1923.
Number of Cases of Notifiable Diseases reported in 1919-1923; by months in 1923.

Source: Public Health Reports des Etats-Unis. — United States Public Health Reports.

Maladie — Disease		Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Coqueluche	Whooping cough	—	—	—	—	92	1	0	21	1	0	2	11	9	16	5	23	3
Diphtérie	Diphtheria	98	149	99	116	262	11	20	15	7	10	25	12	18	27	10	49	58
Fièvre typhoïde	Enteric fever	189	225	429	301	870	30	28	46	29	29	74	83	194	66	67	116	108
Grippe	Influenza	—	6396	634	—	10486	1	0	2408	7821	188	7	0	0	0	12	46	3
Paludisme	Malaria	1957	3077	1289*a*	—	515	15	43	18	12	6	5	11	21	37	40	41	266
Rougeole	Measles	133	417	1296	—	57	0	43	4	2	1	5	1	1	0	0	0	0
Tuberculose pulmonaire	Pulmonary tuberculosis	1137	2487*a*	2555*a*	2562*a*	1556	198	141	113	138	93	102	88	159	129	112	185	98
Varicelle	Chickenpox	—	—	—	69	97	5	8	29	18	8	21	0	2	1	0	3	2
Variole	Smallpox	10	2*a*	1	6	0												

a Décès, le nombre des cas n'est pas reporté. — Deaths, number of cases not reported.

ST. LUCIE — ST. LUCIA

Population: 53 221. E. 1922.

Nombre de cas de quelques maladies déclarés en 1922 et 1923; par mois en 1923.

Number of Cases of Certain Diseases reported in 1921 and 1923; by months in 1923.

Source: Rapports périodiques du Ministère britannique de Santé, 1923. — Current Reports from British Ministry of Health, 1923. Annual Report of the Chief Medical Officer, 1922.

Maladie — Disease		Total 1922	Total 1923	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Juin June	Juill. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Dysenterie	Dysentery	20	28	1	1	2	6		3	1	3	4	1	3	3
Grippe	Influenza	—	48	0	0	0	6		0	3	12	27	0	0	0
Pneumonie	Pneumonia	52	149	2	2	9	18		13	15	22	19	21	18	10

1 cas de variole reporté en 1922; pas de cas, 1919, 1920, 1921 et 1923. — Pas de cas de choléra ou de peste, 1921-1923.
1 case of smallpox notified in 1922, no case in 1919, 1920, 1921 and 1923. — No case of cholera or plague 1921-1923.

ST. VINCENT

Population: 44 925. R. avril 1921.

Nombre de cas de certaines maladies et de décès causés par ces maladies déclarés en 1923; par mois.

Number of Cases of and Deaths from Certain Diseases reported in 1923; by months.

Source: Rapports du Ministère britannique de Santé. — Reports from the British Ministry of Health.

Maladie — Disease			Total 1921	Total 1922	Total 1923	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Juin June	Juillet July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Dysenterie	Dysentery	C.	419	447	161	18	*a*	14	9	10	17	14	17	32	13	8	9
		D.	37	29	7	3	*a*	1	0	0	0	0	0	0	2	0	1
Grippe	Influenza	C.	—	—	1638	140	*a*	282	549	78	22	27	44	131	168	114	83
		D.	—	—	41	1	*a*	2	8	9	3	1	0	1	7	3	6
Pneumonie	Pneumonia	C.	—	—	124	6	*a*	12	8	2	3	10	11	11	25	14	22
		D.	—	—	15	3	*a*	2	2	1	1	0	2	1	1	1	1

Pas de cas de choléra, de fièvre jaune, de peste ou de variole, 1921-1923. — No case of cholera, yellow fever, plague or smallpox, 1921-1923.
a Les données manquent pour le mois de février. — Data are missing for the month of February.

URUGUAY

Population: 1 564 627. E. 31 déc. 1922.

Nombre de cas de maladies à déclaration obligatoire et de décès causés par ces maladies, 1919-1923; par mois en 1923.

Number of Cases of and Deaths from Notifiable Diseases, 1919-1923; by months in 1923.

Source: Boletin des Consejo National de Higiene, Montevideo. — Resumen Anual de Estadistica Municipal, Montevideo.

Maladie — Disease			Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Peste	Plague	C.	6			0	3	1	0	0	0	1	0	0	1	0	0	0	0
		D.	1			0	1	1	0	0	0	0	0	0	0	0	0	0	0
Anthrax	Anthrax	C.				118	186	24	34	26	34	14	8	7	5	6	6	16	6
		D.				25	31	5	5	5	8	2	1	1	1	0	0	1	2
Béri-béri	Beri-beri	C.				0	1	0	0	0	0	0	1	0	0	0	0	0	0
		D.				0	1	0	0	0	0	0	1	0	0	0	0	0	0
Coqueluche	Whooping cough	C.				160	141	20	8	5	7	13	7	5	15	1	32	25	3
		D.	38	71	43	28	12	1	0	2	0	1	1	0	3	2	1	1	0
Diphtérie	Diphtheria	C.				626	617	50	22	35	57	77	94	63	44	41	37	62	35
		D.	109	154	167	51	61	7	2	2	5	13	9	5	5	3	5	1	4
Encéphalite léth.	Encephal. leth.	C.				12	2	1	0	0	0	0	0	1	0	0	0	0	0
		D.				9	3	2	0	0	0	0	1	0	0	0	0	0	0
Erysipèle	Erysipelas	C.				12	4	0	0	0	0	0	0	2	1	0	0	1	0
		D.	11	12	18	10	3	0	0	0	0	0	1	0	2	0	0	0	0
Septicémie puerpérale	Puerperal septicæmia	C.				22	17	1	1	0	2	2	4	1	0	1	2	3	0
		D.	59	81	76	22	27	5	3	2	1	4	3	2	0	2	2	3	0
Fièvre typhoïde	Enteric fever	C.	548	610	1017	624	656	49	54	155	145	85	31	34	21	3	21	13	45
		D.	169	242	284	132	179	8	18	35	34	25	12	14	11	6	2	0	14
Grippe	Influenza	C.				65	194	1	1	0	0	0	42	73	67	7	1	2	0
		D.				8	116	0	0	0	0	1	0	53	39	14	5	3	1
Lèpre	Leprosy	C.				5	2	0	0	0	0	0	0	0	0	0	1	1	0
		D.				6	4	0	1	0	1	2	0	0	0	0	0	0	0
Méningite cérébro-spin.	Cerebro-spinal meningitis	C.				12	6	0	1	1	0	0	1	1	0	1	1	0	0
		D.				2	7	0	0	0	0	1	2	0	0	2	1	0	1
Poliomyélite	Poliomyelitis	C.				15	5	1	0	0	2	1	0	0	0	0	1	0	0
		D.				0	1	0	0	0	0	0	0	0	1	0	0	0	0
Purpura hémorrhagique	Hæmorrhagi cæ purpura	C.				5	3	0	0	0	0	0	0	0	1	0	0	1	1
		D.				5	6	0	0	0	0	0	0	0	1	0	1	2	2
Rougeole	Measles	C.				99	402	25	40	13	6	40	57	9	18	20	43	52	79
		D.	1	114	13	17	40	8	2	5	0	2	1	3	0	0	1	7	11
Scarlatine	Scarlet fever	C.				66	124	10	4	1	8	7	8	9	12	8	5	33	19
		D.	0	4	4	2	0												
Trachome	Trachoma	C.					7	0	0	4	0	0	0	0	0	0	0	3	0
Tuberculose pulmonaire	Pulmonary tuberculosis	C.				1101	993	79	75	71	69	91	73	75	74	87	116	103	80
		D.	1947	1942	1832	1287	1401	80	96	106	102	124	112	145	109	139	133	124	131
Varicelle	Chickenpox	C.				169	289	30	32	4	7	13	33	19	79	18	8	26	20
		D.				1	2	1	0	0	0	0	0	0	0	1	0	0	0
Variole	Smallpox	C.				4	431	256	58	15	7	16	11	0	3	11	10	16	28
		D.	0	2	15	0	18	8	3	1	1	0	1	0	0	3	1	0	0

5 cas et 5 décès de dysenterie en 1922, pas de cas ou de décès en 1923. — 5 cases and 5 deaths from dysentery in 1922, no case or death in 1923.
Pas de cas de choléra ou de fièvre jaune, 1919-1923. — No case of cholera or yellow fever, 1919-1923.

ASIE — ASIA

PROTECTORAT D'ADEN (Arabie) — ADEN PROTECTORATE (Arabia)

Nombre de cas de maladies transmissibles et de décès dus à ces maladies constatés en 1923, par périodes de quatre semaines.
Number of Cases of and Deaths from communicable Diseases reported in 1923, by four-week periods.

Source: Rapports du Ministère britannique de Santé. — Reports from British Ministry of Health.

Maladie — Disease			Périodes de quatre semaines finissant: — Four-week period ending:												
			Total	Jan. Jan. 27	Fév. Feb. 24	Mars March 24	Avril April 21	Mai May 19	Juin June 16	Juill. July 14	Août Aug. 11	Sept. Sept. 8	Oct. Oct. 6	Nov. Nov. 3	Déc. Dec. 1	Déc Dec. 29
Dengue	Dengue	C.	1	0	0	1	0	0	0	0	0	0	0	0	0	0
		D.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dysenterie	Dysentery	C.	12	0	2	0	1	0	1	1	0	2	2	2	0	1
		D.	3	1	1	0	0	0	0	0	0	0	0	1	0	0
Fièvre récurrente	Relaps. fever	C.	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		D.	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Fièvre typhoïde	Enteric fever	C.	2	0	0	0	0	1	0	0	0	0	0	0	0	0
		D.	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Pneumonie	Pneumonia	C.	30	2	4	3	3	1	6	0	2	2	0	3	4	0
		D.	16	2	2	0	2	0	0	2	0	0	0	4	3	1
Varicelle	Chickenpox	C.	1	0	0	1	0	0	0	0	0	0	0	0	0	0
		D.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Variole	Smallpox	C.	43	4	9	11	4	0	2	2	5	0	2	0	0	4
		D.	6	1	1	0	0	0	0	0	3	0	1	0	0	0

CEYLAN — CEYLON

Population: 4 504 549. R. mars 1921.

Nombre de décès causés par la peste et par la variole déclarés en 1923; par périodes de quatre semaines.
Number of Deaths from Plague and Smallpox reported in 1923; by four-week periods.

Source: Rapports du Ministère britannique de Santé. — Reports from the British Ministry of Health.

Maladie / Disease			Total 1923	31 déc. Dec. 31 / 27 janv. Jan. 27	28 janv. Jan. 28 / 24 fév. Feb. 24	25 fév. Feb. 25 / 24 mars Mar. 24	25 mars Mar 25 / 21 avril Apr. 21	22 avril Apr. 22 / 19 mai May 19	20 mai May 20 / 16 juin June 16	17 juin June 17 / 14 juil. July 14	15 juil. July 15 / 11 août Aug. 11	12 août Aug 12 / 8 sept. Sept. 8	9 sept. Sept. 9 / 6 oct. Oct. 6	7 oct. Oct. 7 / 3 nov. Nov. 3	4 nov. Nov. 4 / 1 déc. Déc. 1	2 déc. Dec. 2 / 29 déc. Dec. 29
Peste	Plague	D.	200	21	25	11	16	10	9	17	7	23	16	10	11	24
Variole	Smallpox	C.	175	46	65	23	7	29	0	0	0	1	0	1	1	2
		D.	22	2	10	7	0	1	1	0	0	0	0	1	0	0

Choléra: 628 cas en 1919 et 115 cas en 1920. Aucun cas n'a été déclaré depuis le premier trimestre de 1920.
Cholera: 628 cases in 1919 and 115 cases in 1920. No case has been reported since the first quarter of 1920.

Rapports des hôpitaux de Ceylan.
Hospital Returns for Ceylon.

Décès dus à certaines maladies infectieuses enregistrés dans les hôpitaux de Ceylan.

Deaths from Certain Infectious Diseases registered in the Hospitals of Ceylon.

Maladie — Disease			1920	1921	1922
Peste	Plague	C.	369	187	160
		D.	316	171	150
Ankylostomiase	Ankylostomiasis	C.	11414	11082	9822
		D.	1943	1721	987
Dysenterie	Dysentery	C.	4790	5518	3446
		D.			673
Fièvre typhoïde	Enteric fever	C.	1077	942	857
		D.	280	242	188
Lèpre	Leprosy	C.		*a* 505	100
Variole	Smallpox	C.	126	18	337
		D.			43

a) Total des cas de lèpre restant au 31 décembre 1921.
a) Total number of cases of leprosy remaining on December 31st, 1921.

Décès dus à certaines maladies infectieuses notifiés par la « Registrar-General » de Ceylan.

Deaths from Certain Infectious Diseases reported by the Registrar General for Ceylon.

Cause de décès — Cause of Death		1921	1922
Ankylostomiase	Ankylostomiasis	2930	1869
Diarrhée	Diarrhoe	12573	9700
Dysenterie	Dysentery	4255	2515
Fièvre typhoïde	Enteric fever	668	542
Paludisme	Malaria	1502	1621
Phtisie	Phthisis	3148	3108
Pneumonie	Pneumonia	6708	7486
Rachitisme	Rickets	6462	5119
Rage humaine	Rabies	18	25
Septicémie puerp.	Puerp. septicæmia	1667	1540
Tetanos	Tetanus	230	247

CHYPRE — CYPRUS

(Population: 321 945. E. déc. 1923.)

Nombre de cas de quelques maladies transmissibles constatés en 1919-1923.
Number of Cases of certain Communicable Diseases reported in 1919-1923.

Source: Rapport médical annuel, 1923. — Annual Medical Report, 1923.

Maladie — Disease		1919	1920	1921	1922	1923
Fièvre typhoïde	Enteric fever	439	395	360	346	314
Méningite cérébro-spinale	Cerebro-spinal mening.	10	9	27	7	4
Paludisme	Malaria	1962	3706	4291	4008	4463
Phtisie	Phthisis	130	95	99	108	132

Autres maladies signalées en 1923: — Other diseases reported in 1923:
Variole, 1 cas; diphtérie, 8 cas; trachome, 300 cas; grippe, 2625 cas; dysenterie, 570 cas.
Smallpox, 1; diphtheria, 8; trachoma, 300; influenza, 2625; dysentery, 570.

HONG-KONG

(Population: 625 166. R. 24 avril 1921)

Nombre de cas de maladies à déclaration obligatoire et de décès dus à ces maladies, 1919-1923; par périodes de deux semaines en 1923.
Number of Cases of and Deaths from Notifiable Diseases, 1919-1923; by two-week periods in 1923.

Source: Sanitary Report, 1922. Rapports périodiques en 1923 du Ministère britannique de Santé.
Current Reports in 1923 from British Ministry of Health.

Quinzaine finissant: Fortnight ending:		Diphtérie Diphtheria		Grippe Influenza	Méningite cérébro-spinale Cerebro-spinal meningitis		Peste Plague		Variole Smallpox	
		C.	D.	D.	C.	D.	C.	D.	C.	D.
Total 1919		50	*a*	449	267	*a*	464	*a*	27	*a*
» 1920		76	*a*	542	158	*a*	138	*a*	34	*a*
» 1921		85	38	303	125	73	150	130	191	162
» 1922		71	32	422	53	38	1181	1071	212	189
» 1923		88	37	77	100	74	148	132	1298	1044
Janvier — January	13	5	1	4	5	0	1	0	2	1
	27	7	2	1	4	4	1	0	1	0
Février — February	10	11	7	1	2	2	0	0	2	0
	24	7	5	3	2	1	1	1	8	6
Mars — March	10	5	2	2	5	5	1	1	16	15
	24	3	2	3	11	4	1	0	14	11
Avril — April	7	6	4	0	8	9	2	3	20	10
	21	3	0	2	5	3	8	6	32	18
Mai — May	5	0	0	2	5	0	4	2	24	24
	19	5	0	2	2	3	9	5	33	26
Juin — June	2	4	1	4	7	6	38	30	23	24
	16	1	0	10	5	4	20	20	40	36
	30	0	0	3	9	8	26	24	51	41
Juillet — July	14	3	0	5	6	7	10	14	21	13
	28	1	0	8	0	0	13	14	16	16
Août — August	11	2	1	0	4	2	4	4	10	9
	25	0	0	2	1	2	3	2	9	10
Septembre — September	8	2	1	6	5	3	3	0	14	7
	22	1	1	5	2	1	2	4	11	10
Octobre — October	6	1	0	4	4	5	1	2	20	14
	20	5	2	2	1	1	0	0	65	32
Novembre — November	3	1	2	4	2	2	0	0	107	114
	17	3	1	0	0	0	0	0	178	146
Décembre — December	1	3	2	1	0	0	0	0	215	170
	15	3	1	3	1	1	0	0	180	161
	29	6	2	0	4	1	0	0	186	130

Autres maladies déclarées: — Other diseases notified:

	1919		1920		1921		1922		1923	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
Choléra asiatique — Asiatic cholera	46	42	6	*a*	5	5	1	0	1	0
Fièvre récurrente — Relapsing fever	*a*	*a*	*a*	*a*	1	0	5	5	0	0
Typhus exanth. — Typhus	*a*	*a*	*a*	*a*	0	0	0	0	0	0

a Pas de renseignements. — No report.

INDES BRITANNIQUES — BRITISH INDIA

(Population: 318 942 480. R. 18 mars 1921.)

Nombre de décès causés par le choléra asiatique, la peste et la variole, 1919-1923.
Number of Deaths from Asiatic Cholera, Plague and Smallpox, 1919-1923.

Source: Annual Reports of the Public Health Commissioner with the Government of India, 1919-1921; Quarterly Reports for Births and Deaths, 1922 and 1923.

Province	Choléra — Cholera					Peste — Plague					Variole — Smallpox					Province
	1919	1920	1921	1922	1923	1919	1920	1921	1922	1923	1919	1920	1921	1922	1923	
Provinces britann.																*British Provinces*
Ajmer-Merwara . .	59	1	35	*a*	*a*	47	0	0	*a*	*a*	73	325	724	*a*	*a*	Ajmer-Merwara
Assam	33980	2421	12829	15565	3825	0	0	0	0	0	1432	1700	2774	2402	3219	Assam
Bihar et Orissa . .	104727	26341	90688	26635	8130	16601	19108	16504	15100	28822	10175	23001	7836	2511	3116	Bihar and Orissa
Birmanie	13260	3396	3791	4496	1825	4397	5483	4403	7206	7628	3917	2853	987	1601	2720	Burma
Courg	157	6	0	0	0	0	68	1	0	0	529	108	6	0	0	Coorg
Pendjab	8561	138	19215	129	0	11068	6137	2553	7751	49723	15365	9319	4575	1507	2053	Punjab
Présid. du Bengale .	124949	54199	80547	51383	41483	424	66	59	150	82	37010	36190	8157	7790	4234	Bengal Presidency
Présid. de Bombay .	51551	2047	3521	2758	8735	9626	13857	4672	7126	32165	6232	3536	1771	702	2495	Bombay Presidency
Présidence de Madras	93262	31139	27064	15321	4929	5658	14652	11875	9296	11719	41732	13697	9792	21514	22433	Madras Presidency
Provinces Centrales	62089	3491	58331	74	1090	9219	14374	5467	6138	26297	7342	2176	1787	404	275	Central Provinces
Province de Delhi .	66	7	635	12	10	1	19	1	192	2795	73	19	22	27	67	Delhi Province
Provinces frontières du Nord-Ouest. .	4400	2	4285	0	0	3	732	138	118	3738	1204	2051	576	104	94	North-West Frontier Provinces
Provinces Unies . .	81365	6952	149667	2330	2595	17240	24872	24009	23292	74088	10993	6354	1439	241	734	United Provinces
Total .	578426	130140	450608	118703	72622	74284	99368	69682	76369	237057	136077	101329	40446	38803	41440	Total
Agences et Etats indiens:																*Indian States and Agencies:*
Etat d'Hyderabad .	13321	57	1381	*a*	*a*	12096	20128	1294	*a*	*a*	*a*	*a*	*a*	*a*	*a*	Hyderabad State
Etat de Mysore . .	2306	220	25	*a*	*a*	4871	7670	8244	*a*	*a*	*a*	*a*	*a*	*a*	*a*	Mysore State
Autres agences et Etats indiens . .	*a*	*a*	*a*	*a*	73	7331	13093	2301	162	2424	*a*	*a*	*a*	9	131	Other Indian States and Agencies
Total .	15627	277	1406	*a*	73	24298	40891	11839	*a*	2424	*a*	*a*	*a*	9	131	Total
Grand total . . .	594053	130417	452014	118703	72695	98582	140259	81521	76531	239481	136077	101329	40446	38812	41571	Grand total

a Les données manquent. — Data not received.

IRAK (Mésopotamie) — IRAQ (Mesopotamia)

(Population: 2 849 282. R. 1920)

Nombre de cas de maladies infectieuses et de décès dus à ces maladies constatés en 1921-1923; par mois en 1923.
Number of Cases of and Deaths from Infectious Diseases reported in 1921-1923; by months in 1923.

Source: Rapports du Ministère britannique de Santé, 1923. — Report on Iraq Administration, October 1920–March 1922 (et — and) April 1922 to March 1923. Reports from British Ministry of Health, 1923.

Maladie — Disease			Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Choléra	Cholera	C.	0	0	1503	0	0	0	0	0	0	0	382	773	335	11	2
		D.	*a*	*a*	1098	0	0	0	0	0	0	0	250	585	256	6	1
Diphtérie	Diphtheria	C.	*a*	43	26	1	2	1	2	2	1	1	3	2	2	6	3
		D.	*a*	*a*	8	0	0	0	1	1	0	0	1	0	1	4	0
Dysentérie	Dysentery	C.	*a*	*a*	9	0	1	1	2	0	0	0	0	0	4	1	0
		D.	*a*	*a*	1	0	0	0	0	0	0	0	0	0	1	0	0
Fièvre puerpérale	Puerperal fever	C.	*a*	39	9	1	1	0	1	2	1	1	1	0	1	0	0
		D.	*a*	*a*	6	1	0	0	1	2	0	1	1	0	0	0	0
Fièvre typhoïde et paratyphoïde	Enteric fever	C.	87	104	147	4	8	4	8	15	17	6	16	13	28	8	20
		D.	*a*	*a*	31	0	1	0	1	5	4	1	2	1	7	3	6
Grippe	Influenza	C.	*a*	10	4	0	1	0	0	0	3	0	0	0	0	0	0
		D.	*a*	*a*	1	0	1	0	0	0	0	0	0	0	0	0	0
Méningite cérébro-spinale	Cerebro-spinal meningitis	C.	26	12	8	1	0	2	2	0	0	0	3	0	0	0	0
		D.	*a*	*a*	6	1	0	2	1	0	0	0	2	0	0	0	0
Oreillons	Mumps	C.	92	229	54	4	1	0	1	0	0	6	9	6	6	1	20
Peste	Plague	C.	137	685	708	3	10	18	100	375	152	29	2	2	1	1	15
		D.	*a*	*a*	413	1	8	8	51	236	86	9	1	1	0	0	12
Rougeole	Measles	C.	605	87	461	1	2	0	1	0	157	105	19	7	4	22	143
		D.	*a*	*a*	120	1	0	0	0	0	18	8	3	4	4	13	69
Scarlatine	Scarlet fever	C.	*a*	7	2*	0	0	0	0	1	0	0	0	0	0	0	1
Tétanos	Tetanus	C.	*a*	14	7	0	0	0	0	0	0	1	3	0	2	0	1
		D.	*a*	*a*	2	0	0	0	0	0	0	0	1	0	0	1	0
Tuberculose	Tuberculosis	C.	178 *b*	398 *b*	482 *b*	19	46	39	29	31	55	37	58	61	28	30	49
		D.	*a*	*a*	52	1	1	1	1	0	4	3	10	2	8	8	13
Typhus exanth.	Typhus	C.	61	48	20	1	2	3	2	6	2	0	1	2	1	0	0
		D.	*a*	*a*	4	0	1	0	1	1	0	0	0	1	0	0	0
Varicelle	Chickenpox	C.	90	56	21	1	0	2	6	6	2	0	1	0	0	0	3
		D.	*a*	*a*	1	0	0	1	0	0	0	0	0	0	0	0	0
Variole	Smallpox	C.	475	1826	885	58	29	45	95	76	74	39	54	81	85	132	117
		D.	*a*	*a*	325	28	4	3	16	7	20	12	22	41	35	70	67

Autres maladies déclarées: — Other diseases declared:

	Anthrax Anthrax		Bilharzia Bilharzia		Erysipèle Erysipelas		Fèvre récurrente Rielapsing fever		Gale Scabies		Lèpre Leprosy		Méningite Meningitis		Gonorrhée Gonorrhœa
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.
1922	6	*a*	*a*	*a*	*a*	*a*	*a*	*a*	*a*	*a*	42	*a*	*a*	*a*	*a*
1923	8	1	3	0	2	0	1	0	1	0	2	0	4	2	1

* Pas de décès. — No deaths.
a Les données n'étaient pas incluses dans les rapports reçus. — Data not included in the reports received.
b Tuberculose, toutes formes, 1921 et 1922; tuberculose pulmonaire, 1923. — Tuberculosis, all forms, 1921 and 1922; pulmonary tuberculosis, 1923.

JAPON (proprement dit) — JAPAN (exclusive of Territories)

Population: 55 963 053. R. 1er oct. 1920.

Nombre de cas de maladies à déclaration obligatoire et de décès causés par ces maladies déclarés en Japon, 1919-1923; par mois en 1923.

Number of Cases of and Deaths from Notifiable Diseases reported in Japan, 1919-1923; by months in 1923.

Source: Revue sanitaire du Département de l'Intérieur du Japon. — Sanitary Review of the Home Department of Japan.

Maladie — Disease			Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juill. July	Août Aug.	Sept. Sept.	Oct. Oct	Nov. Nov.	Déc. Dec.
Diphtérie	Diphtheria	C.	14280	15173	14522	13969	12867	1570	1472	1455	1149	1022	751	633	390	559	999	1271	1596
		D.	3343	3439	3501	3251	3091	437	372	379	277	229	193	138	84	123	173	271	415
Dysenterie	Dysentery	C.	12915	12728	12445	14899	20491	130	111	176	275	569	1490	3727	4392	4485	3521	1272	343
		D.	2920	2961	2941	3831	7259	59	51	84	129	275	606	1366	1539	1053	1257	553	287
Fièvre para-typhoïde	Paratyphoid fever	C.	7435	7734	6291	7150	5352	145	106	124	126	242	390	606	1024	714	948	531	396
		D.	836	850	802	852	662	24	21	15	15	30	40	59	105	101	117	80	55
Fièvre typhoïde	Typhoid fever	C.	54706	53902	50133	52381	52275	1965	1739	1678	1484	2437	3336	4816	7060	7053	8350	6701	5656
		D.	11156	10325	10634	11080	11242	470	460	416	363	443	618	859	1356	1357	1840	1570	1490
Méningite cérébro-spin.	Cerebro-spinal meningitis	C.	2456	944	771	933	704	43	43	92	88	70	60	59	35	83	83	28	20
		D.	1261	493	413	531	382	15	28	49	41	41	32	36	22	36	55	16	11
Scarlatine	Scarlet fever	C.	1325	1368	1589	1654	1571	136	166	174	162	148	137	102	69	54	86	149	188
		D.	109	90	82	96	102	15	10	11	10	11	13	3	5	3	8	7	6
Typhus exanth.	Typhus	C.	225	66	171	23	15	0	0	1	0	1	1	11	0	0	0	1	0
		D.	30	3	22	5	3	0	0	1	0	0	0	1	0	0	0	0	1
Variole	Smallpox	C.	4055	3166	889	673	1881	69	295	266	276	239	325	104	26	2	36	37	206
		D.	1115	844	212	125	374	19	62	62	43	49	54	21	4	0	2	6	52

Autres maladies déclarées: — Other diseases notified:

		1919	1920	1921	1922	1923
Choléra asiatique — Asiatic cholera	C.	2912	4969	29	730	0
	D	915	3112	16	417	0
Peste — Plague	C.	3	22	2	118	1
	D.	2	16	0	79	1

MALAISIE (Etats fédérés) — MALAY STATES (Federated)

(Population: 1 324 890. R. 24 avril 1921)

Nombre de cas de peste et de variole et de décès dus à ces maladies, 1921-1923; par périodes de quatre semaines en 1923.

Number of Cases of and Deaths from Plague and Smallpox, 1921-1923; by four-week periods in 1923.

Source: Rapports du Ministère britannique de Santé. — Reports from British Ministry of Health.

Maladie — Disease		Total 1921	Total 1922	Total 1923	30 déc. 26 janv.	27 janv. 23 fév.	24 fév. 23 mars	24 mars 20 avril	21 avril 18 mai	19 mai 15 juin	16 juin 13 juill.	14 juill. 10 août	11 août 7 sept.	8 sept. 5 oct.	6 oct. 2 nov.	3 nov. 30 nov.	1er déc. 28 déc.
Peste	Plague																
cas	cases	0	1	11	0	0	0	0	0	11	0	0	0	0	0	0	0
décès	deaths	0	1	10	0	0	2	1	1	6	0	0	0	0	0	0	0
Variole	Smallpox																
cas	cases	76	16	30	3	3	4	0	1	0	0	0	0	9	8	1	1
décès	deaths	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0

Grippe: 1.784 cas et 51 décès en 1921; 1,653 cas et 46 décès en 1922; 153 cas pendant la période du 24 novembre au 7 décembre 1923.
Influenza: 1,784 cases and 51 deaths in 1921; 1,653 cases and 46 deaths in 1922; 153 cases during the period November 24th—December 7th, 1923.

MALAISIE (non fédérée) — MALAY STATES (Unfederated)

JOHORE

(Population: 1 149 395. R. 24 avril 1921)

Nombre de décès dus à la dysenterie, à la grippe et à la pneumonie constatés, en 1923; par périodes de quatre semaines.

Number of Deaths due to Dysentery, Influenza, and Pneumonia, reported in 1923; by four-week periods.

Source: Rapports du Ministère britannique de Santé. — Reports from British Ministry of Health.

Décès — Deaths		Total 1922	Total 1923	31 déc. 27 janv.	28 janv. 24 fév.	25 fév. 24 mars	25 mars 21 avril	22 avril 19 mai	20 mai 16 juin	17 juin 14 juill.	15 juill. 11 août	12 août 8 sept.	9 sept. 6 oct.	7 oct. 3 nov.	4 nov. 1 déc.	2 déc. 29 déc.
Dysenterie	Dysentery	—	156	9	9	7	12	11	16	19	13	13	11	8	16	12
Grippe	Influenza	72	31	1	4	2	3	3	5	9	2	0	0	0	0	2
Pneumonie	Pneumonia	—	204	8	11	9	12	15	22	19	15	20	22	17	17	17

Données reçues relatives à quelques maladies: — Data received for certain other diseases:

	Fièvre typhoïde Enteric fever	Ménin. cérébro-spin. Cerebro-spin. meningitis	Peste Plague	Variole Smallpox	
	D.	D.	D.	C.	D.
1922	4	20	—	87	6
1923	1	2	3	0	0

Décès causés par le béri-béri: — Deaths from beri-beri: 1919, 580; 1920, 388; 1921, 338; 1922, 318.

PALESTINE

Population: 757 182. R. 23 oct. 1922.

Nombre de cas de maladies à déclaration obligatoire et de décès causés par ces maladies déclarés en Palestine, 1921-1923; par mois en 1923.
Number of Cases of and Deaths from Notifiable Diseases reported in Palestine, 1921-1923; by months in 1923.

Source: Rapports du Service de Santé. — Reports from the Department of Health.

Maladie — Disease			Total 1921	Total 1922	Total 1923	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Juin June	Juillet July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Dysenterie	Dysentery	C.	100	128	234	5	4	2	7	16	13	21	15	24	53	27	47
		D.	6	10	16	2	0	0	1	1	3	2	0	1	3	1	2
Fièvre récur.	Relaps. fever	C.	51	26	8	0	0	0	2	1	4	0	0	0	0	0	1
		D.	0	0	0												
Grippe	Influenza	C.	2381	209	275	1	53	92	79	21	10	6	1	0	0	2	10
		D.	196	14	15	0	0	5	4	3	1	1	0	0	0	0	1
Méningite cérébro-spin.	Cereb.-spin. meningitis	C.	15	23	5	1	0	1	1	1	0	1	0	0	0	0	0
		D.	10	19	4	0	0	1	1	1	0	1	0	0	0	0	0
Peste	Plague	C.	4	64	15	0	0	0	0	2	7	3	1	2	0	0	0
		D.	1	19	5	0	0	0	0	2	1	0	0	1	1	0	0
Pneumonie	Pneumonia	C.	705	620	858	86	95	128	108	78	59	42	62	30	48	46	76
		D.	366	312	504	46	48	68	48	45	45	31	39	22	34	27	51
Poliomyélite	Poliomyelitis	C.	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
		D.	0	0	0												
Typhus exan.	Typhus	C.	63	34	33	2	3	1	8	5	2	2	1	2	1	5	1
		D.	6	0	5	3	0	0	2	0	0	0	0	0	0	0	0
Variole	Smallpox	C.	2	39	9	6	2	0	0	0	1	0	0	0	0	0	0
		D.	2	6	5	2	3	0	0	0	0	0	0	0	0	0	0

SIAM

Population: 9 221 000. E. 1922.

Nombre de cas de maladies à déclaration obligatoire et de décès causés par ces maladies déclarés en Siam, 1919-1923; par mois en 1923.
Number of Cases of and Deaths from Notifiable Diseases reported in Siam, 1919-1923; by months in 1923.

Source: Rapports du Service de Santé. — Reports from Department of Public Health.

Maladie — Disease			Total 1919	Total 1920	Total 1921	Total 1922	Total 1923	Jan. Jan.	Fév. Feb.	Mars Mar.	Avril April	Mai May	Juin June	Juil. July	Août Aug.	Sept. Sept.	Oct. Oct.	Nov. Nov.	Déc. Dec.
Choléra	Cholera	C.	14574	3853	*b* 103	82	170	2	0	2	27	87	35	15	2	0	0	0	0
		D.	10277	2748	42	47	82	2	0	2	11	40	19	6	2	0	0	0	0
Peste	Plague	C.	229	172	130	135	167	38	37	17	22	25	12	9	4	0	0	0	3
		D.	182	135	103	110	127	32	22	15	15	21	10	6	4	0	0	0	2
Méningite cérébro-spin.	Cerebrospinal meningitis	C.					28	0	2	1	4	6	3	6	2	0	4	0	0
		D.					8	0	1	1	2	2	0	2	0	0	0	0	0
Variole	Smallpox	C.	*a* 50	*a* 85	*a* 404	460	583	0	2	8	14	8	9	66	197	51	108	39	81
		D.	*a* 19	*a* 26	*a* 102	117	229	0	0	0	1	1	2	17	134	22	25	6	22

a Total pour année d'après le calendrier siamois, commençant le 1er avril et finissant le 31 mars.
a Total for year as per Siamese calender, commencing April 1st and ending March 31st.
b Pour le premier trimestre, les données ne sont que pour la ville de Bangkok.
b For the first quarter, dara are given for the town of Bangkok only.

(ÉTABLISSEMENTS DES DÉTROITS — STRAITS SETTLEMENTS)

(Population: 906 137. E. 1922)

Nombre de décès causés par les maladies infectieuses, 1919-1923. — Number of Deaths from Infectious Diseases, 1919-1923.

Source: Annual Report on the Medical Department, 1919, 1920, 1921, 1922.
Rapports du Ministère britannique de santé, 1923.— Reports from British Ministry of Health, 1923.

Maladie — Disease			Total 1919	Total 1920	Total 1921	Total 1922	Total 1923
Béri-béri	Beri-beri	D.	1430	1025	1299	1388	894
Choléra	Cholera	C.	94	58	6	3	0
		D.	71	37	4	2	0
Diphtérie	Diphtheria	D.	11	25	13	13	*a* 12
Dysentérie	Dysentery	D.	1209	1085	1090	1085	795
Fièvre typhoïde et paratyphoïde	Enteric fever	D.	94	103	117	53	*a* 48
Grippe	Influenza	D.	*b*	362	207	234	165
Méningite cérébro-spinale	Cerebro-spinal meningitis	C.	*b*	29	86	85	*a* 14
		D.	*b*	22	54	45	21
Paludisme	Malaria	D.	4843	4690	4703	3977	2438
Peste	Plague	C.	19	61	27	39	*a* 55
		D.	16	55	27	39	60
Pneumonie	Pneumonia	D.		1966	1230	1608	1602
Tuberculose	Tuberculosis	D.	3112	3336	3258	2966	2508
Variole	Smallpox	C.	480	105	155	330	55
		D.	166	43	37	80	4
		D.					

a Données pour Singapour, Penang et Malacca seulement. — Data for Singapore, Penang and Malacca only.
b Pas de renseignements. — No report.

Singapour — Singapore, Penang, Malacca

(Population: 757 269. E: 1922)

Nombre de décès causés par les maladies infectieuses en 1913; par périodes de 4 semaines.
Number of Deaths from Infectious Diseases in 1923; by periods of 4 weeks.

Source: Rapports du Ministère britannique de Santé. — Reports from British Ministry of Health.

Période de 4 semaines finissant: 4-week period ending:	Béri béri Beri-beri	Diphtérie Diphtheria	Dysenterie Dysentery	Fièvre typh. et paratyph. Enteric fever	Grippe Influenza	Méningite cér.-spin. Cer.-spin. mening.	Paludisme Malaria	Peste Plague	Pneumonie Pneumonia	Tuberculose Tuberculosis	Variole Smallpox
Total 1923	813	12	737	48	161	17	1367	56	1562	2123	2
Janv.—Jan. 27	82	0	62	4	12	0	108	1	113	195	0
Févr.—Febr. 24	47	0	65	4	12	0	69	5	109	174	0
Mars—March 24	60	2	61	4	11	0	78	7	103	176	1
Avril—April 21	55	0	58	2	18	1	118	9	134	158	0
Mai—May 19	57	0	68	4	18	3	122	4	160	170	0
Juin—June 16	72	0	65	3	15	0	136	5	151	192	0
Juillet—July 14	55	0	69	4	14	1	121	4	131	173	0
Août—August 11	62	1	50	5	14	2	110	6	129	150	0
Sept.—Sept. 9	53	1	63	6	3	2	111	4	112	154	0
Oct.—Oct. 6	35	3	21	4	5	4	80	5	84	125	0
Nov.—Nov. 3	60	1	52	3	9	3	100	1	61	161	0
Déc.—Dec. 1	82	0	48	3	14	1	112	2	134	138	0
» » 29	93	4	55	2	16	0	102	3	141	157	1

AUSTRALASIE — AUSTRALASIA

AUSTRALIE — AUSTRALIA

Population: 5 634 552. E. 31 déc. 1922.

Nombre de cas de maladies à déclaration obligatoire déclarés en Australie, 1921-1923; par périodes des quatre semaines en 1923.
Number of cases of Notifiable Diseases reported in Australia, 1921-1923; by four-week periods in 1923.

Source: *Health*, Journal of Commonwealth Health Department, 1923 (et — and) Medical Journal of Australia.

Maladie — Disease		Total 1921	Total 1922	Total 1923	31 déc. 27 jan.	28 jan. 24 fév.	25 fév. 24 mars	25 mars 21 avril	22 avril 19 mai	20 mai 16 juin	17 juin 14 juill.	15 juill. 11 août	12 août 8 sept.	9 sept. 6 oct.	7 oct. 3 nov.	4 nov. 1 déc.	2 déc. 29 déc.
Peste	Plague	106	46	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Diphtérie	Diphtheria	24783	14156	9915	660	810	952	1014	1085	1035	903	600	649	534	538	536	599
Encéphalite létharg.	Encephalitis letharg.			23	1	0	3	1	1	2	1	4	2	4	1	1	2
Fièvre typhoïde	Enteric fever	2899	1936	2277	315	330	320	269	273	159	58	33	67	66	93	118	176
Méningite cérébro-spinale	Cerebro-spinal meningitis	80	69	61	2	4	3	2	6	12	3	6	4	9	1	7	2
Poliomyélite aiguë	Acute poliomyelitis	*a* 140	114	137	6	16	18	13	26	16	7	9	6	3	1	7	9
Scarlatine	Scarlet fever	6104	5779	6469	402	495	638	741	760	618	531	439	411	391	361	322	360
Tuberculose	Tuberculosis			3580	292	271	287	240	323	276	229	283	274	296	294	276	239

9 cas d'anthrax en 1921, 6 cas en 1922 et 3 cas en 1923; pas de cas de fièvre récurrente, 1921-1923; 1 cas de lèpre en 1923, pas de cas en 1921 et 1922; cas de tetanos en 1922 et 7 cas en 1923, pas de cas en 1921; 8 cas de variole en 1921, pas de cas en 1922 et 1923.
9 cases of anthrax in 1921, 6 cases in 1922 and 3 cases in 1923; no case of relapsing fever, 1921-1923; 1 case of leprosy in 1923, no case in 1921 and 1922; cases of tetanus in 1922 and 7 cases in 1923, no case in 1921; 8 cases of smallpox in 1921, no case in 1922 and 1923.

a Total pour cinq Etats seulement; les données pour l'Australie du Sud manquent.
a Total for five States only; data for Southern Australia are not available.

AUSTRALIE — AUSTRALIA

Population: 5 634 552. E. 31 déc. 1922.

Nombre de cas de maladies à déclaration obligatoire déclarés dans les Etats d'Australie, 1919-1923.
Number of Cases of Notifiable Diseases reported in the States of Australia, 1919-1923.

Source: Health, Journal of Health Department, 1923. Medical Journal of Australia, 1922-1923; (pour 1921-1922 — for 1921-192
Rapports du Ministère britannique de Santé pour les années 1919-1920. — Reports from the British Ministry of Healt
for years 1919-1920.

Maladie — Disease		1919	1920	1921	1922	1923	1919	1920	1921	1922	1923	1919	1920	1921	1922	1923
		Queensland *g* Population: 790 239					Victoria Population: 1 590 512					Australie Occidentale Western Australia Population: 343 032				
Choléra	Cholera	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Peste	Plague	0	0	104	13	0	0	0	0	0	0	0	0	0	0	0
Ankylostomiase	Ankylostomiasis	32	5	89	107	—	—	—	0	0	—	—	—	1	—	—
Anthrax	Anthrax	0	0	1	0	—	1	1	2	1	2	—	—	—	0	—
Béri-béri	Beri-beri	—	—	—	—	—	—	—	—	—	—	32	63	21	33	19
Bilharzia	Bilharzia	1	1	1	1	—	—	—	0	0	—	6	—	0	1	—
Dengue	Dengue	—	—	—	—	—	—	—	—	—	—	271	38	27	16	3
Diphtérie	Diphtheria	1811	1117	2423	1275	1066	4007	6458	9458	5025	3142	971	1080	1020	584	494
Dysenterie	Dysentery	2	—	11	0	3	—	—	6	2	7	—	49	21	10	6
Encéphalite let.	Encephalitis leth.	—	—	—	—	0	—	—	2	18	21	—	—	—	—	1
Erysipèle	Erysipelas	116	121	100	124	102	—	—	—	—	—	49	38	56	41	38
Fièvre continue	Continued fever	—	1	0	0	—	—	—	0	0	—	—	1	2	1	—
Fièvre puerp.	Puerperal fever	27	26	30	28	20	—	—	52	61	40	—	—	13	4	8
Fièvre typhoïde	Enteric fever	724	702	468	400	516	263	433	532	294	410	236	387	391	244	261
Grippe	Influenza	*a* 20669	18802	274	9	—	—	—	—	—	—	*c* 5559	*c* 227	19	1	3
Méningite céréb.-spin.	Cerebro-spinal meningitis	25	32	19	22	9	—	—	20	13	8	4	3	0	0	2
Paludisme	Malaria	10	9	4	17	2	—	—	7	5	4	686	57	38	40	24
Poliomyélite	Poliomyelitis	119	17	28	11	1	—	—	21	22	7	2	8	1	0	8
Scarlatine	Scarlet fever	316	340	381	215	311	1763	2259	2816	1889	1572	657	468	234	97	58
Tétanos	Tetanus	—	—	—	—	—	—	—	—	5	6	—	—	—	—	1
Tuberculose pulmonaire	Pulmonary tuberculosis	*b* 410	*b* 374	619	450	393	—	—	1171	1098	987	*f* 467	*f* 442	449	388	362
Variole	Smallpox	0	0	0	0	0	0	0	8	0	—	—	—	0	0	0
Maladies vénériennes	Venereal diseases	—	—	—	—	—	—	—	—	—	—	1038	983	1125	727	—
Chancre mou	Soft chancre	28	151	*e* 77	*e* 40	*e* 24	—	—	—	—	—					
Gonorrhée	Gonorrhœa	1750	2254	*e* 1944	*e* 1581	*e* 1508	—	—	—	—	—					
Syphilis prim.	Prim. syphilis	147	351	*e* 241	*e* 154	*e* 141	—	—	—	—	—					
Syphilis second.	Second. syphilis	75	79	*e* 32	*e* 20	*e* 13	—	—	—	—	—					
		Nouvelles Galles du Sud New South Wales Population: 2 172 227					Australie du Sud Southern Australia Population: 513 410					Tasmanie *g* Tasmania *g* Population: 219 021				
Choléra	Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peste	Plague	0	0	2	33	1	0	0	0	0	0	0	0	0	0	0
Anthrax	Anthrax	3	7	6	5	—	0	0	0	0	1	0	0	0	0	0
Bilharzia	Bilharzia	—	—	—	—	—	—	—	—	—	—	2	—	1	0	—
Coqueluche	Whooping cough	—	—	—	—	—	—	—	391	54	930	—	—	—	—	—
Diphtérie	Diphtheria	2826	5042	6916	4128	3499	1328	1426	2763	1508	844	915	901	2203	1636	870
Encéphalite léthargique	Encephalitis lethargica	—	—	—	—	0	—	—	—	—	0	—	2	1	—	1
Erysipèle	Erysipelas	—	—	—	—	—	—	—	121	108	102	—	—	—	—	—
Fièvre puerp.	Puerperal fever	—	—	—	—	—	—	—	21	16	30	12	14	22	16	11
Fièvre typh.	Enteric fever	857	1016	949	718	879	125	176	251	143	121	163	236	308	137	90
Grippe	Influenza	—	—	—	—	—	—	—	414	36	1133	—	*c* 898	—	—	—
Méningite cérébrospin.	Cerebro-spinal meningitis	23	34	33	22	28	—	—	6	6	6	13	6	2	6	8
Paludisme	Malaria	35	—	—	—	—	—	—	1	2	0	—	5	2	0	0
Poliomyélite	Poliomyelitis	8	45	88	31	104	—	—	—	47	17	5	1	2	3	0
Rougeole	Measles	—	—	—	—	—	—	—	4498	555	1037	—	—	—	—	—
Scarlatine	Scarlet fever	959	937	1060	1162	2635	1227	1142	1245	1421	1296	32	34	368	995	597
Tuberculose pulmonaire	Pulmonary tuberculosis	*d* 1102	*d* 1509	*d* 1235	*d* 1117	*d* 1198	—	—	499	492	481	*b* 189	*b* 204	241	170	159
Varicelle	Chickenpox	—	—	—	—	—	—	—	—	448	320	—	—	—	—	—
Variole	Smallpox	0	0	0	0	0	—	—	0	0	0	0	0	0	0	0
Chancre mou	Soft chancre	—	—	288	155	—	—	—	—	—	—	6	15	24	36	—
Gonorrhée	Gonorrhœa	—	—	6992	4850	—	—	—	—	—	—	307	378	290	316	—
Syphilis	Syphilis	—	—	2055	1270	—	—	—	—	—	—	53	95	105	121	—

644 cas de goitre reportés dans l'état de Tasmanie. — 644 cases of goitre reported from Tasmania.

a Pendant la période de mai-juin 1919. — For period May-June 1919.
b Reportés sous le nom de phtisie: — Reported as phthisis.
c Reportés sous le nom d'influenza pneumonique. — Reported as pneumonic influenza.
d Données pour tuberculose toutes formes; à déclaration obligatoire seulement dans une partie de l'Etat. — Data given for tuberculosis all forms; notifiable only in portion of the State.
e Données pour année finissant le 30 juin. — Data for year ending June 30th.
f Données pour tuberculose toutes formes. — Data given for tuberculosis all forms.
g Les données pour les années 1919 et 1920 pour le Queensland et la Tasmanie sont pour années finissant le 30 juin des années désignées au haut du tableau.
g For Queensland and Tasmania for years 1919 and 1920, the data are for years ending June 30th of years designated.

NOUVELLE-ZÉLANDE — NEW ZEALAND

(Population: 1 265 397. E. 31 déc. 1922.)

Nombre de cas et de décès dus aux maladies à déclaration obligatoire déclarés en Nouvelle-Zélande, 1919-1923; par semaines en 1923.
Number of Cases of and Deaths from Notifiable Diseases reported in New Zealand, 1919-1923; by weeks in 1923.

Source: Rapports hebdomadaires du Directeur général du Service de Santé et Rapports annuels.
Weekly Reports from Director-General of Department of Health and Annual Reports.

Semaine finissant: / Week ending:	Diphtérie / Diphtheria		Encéphalite létharg. / Encephalitis letharg. A		Erysipèle / Erisypelas		Fièvre typhoïde et para-typhoïde / Enteric fever		Grippe pulmonaire, fulminante et septicém. / Pneumonic, fulminant a. septicaemic influenza B		Méningite cérébro-spinale / Cerebro-spinal meningitis		Pneumonie primaire aiguë / Acute primary pneumonia		Poliomyélite / Polio-myelitis		Scarlatine / Scarlet fever		Septicémie puerpérale / Puerperal septicaemia		Tuberculose / Tuberculosis	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
Total 1919	3499	149	90	29	73	7	477	34	—	—	96	40	879	401	11	1	1521	23	79	52	984	762
Total 1920	2442	91	42	19	156	5	389	40	*470	*480	79	34	1933	528	76	2	1248	15	124	67	1305	851
Total 1921	2611	103	23	14	228	5	451	24	295	105	56	23	1029	427	267	9	1845	24	178	48	1207	793
Total 1922	1989	78	36	13	271	13	539	67	216	66	42	23	946	407	98	9	1449	10	262	52	1129	821
Total 1923	1936	66	41	11	214	9	275	29	1155	222	36	14	782	243	16	1	1208	9	177	40	1005	507
Janvier — January 8	27	2	1	0	1	0	6	1	4	1	0	0	14	4	0	0	16	0	5	0	18	11
15	26	1	0	0	3	1	7	2	0	0	1	0	11	4	0	0	23	0	1	1	26	7
22	26	1	0	1	6	0	13	1	0	0	0	0	10	3	1	0	14	1	2	0	17	13
29	20	0	0	0	6	0	3	0	0	0	0	0	5	1	1	0	9	0	3	0	17	6
Février — February 5	27	0	1	0	3	0	20	3	1	0	0	0	6	1	2	0	18	0	3	0	27	6
12	56	1	1	1	1	0	10	0	1	0	1	1	3	2	0	0	11	0	10	0	16	7
19	44	2	0	0	3	0	6	0	2	1	0	0	4	3	0	0	21	0	5	1	19	9
26	23	0	0	0	4	0	6	2	1	0	0	0	8	5	1	0	15	0	2	2	10	10
Mars — March 5	42	2	1	0	4	1	7	0	1	0	0	0	12	5	0	0	20	0	0	2	26	6
12	46	1	0	0	5	0	3	2	2	0	1	1	9	5	0	0	29	1	1	0	16	5
19	39	3	1	0	3	0	6	1	1	0	0	0	8	6	2	0	35	0	6	2	25	10
26	44	1	0	0	4	0	11	0	1	0	2	0	17	1	0	0	19	1	7	1	25	9
Avril — April 2	35	0	0	0	1	0	2	0	1	0	2	0	6	1	2	0	28	0	2	0	16	5
9	53	2	0	0	2	0	4	0	1	0	0	0	6	3	0	0	32	0	1	1	25	13
16	31	2	0	0	7	0	2	0	3	1	0	0	3	1	0	0	23	0	2	0	13	8
23	48	0	0	0	3	0	5	0	1	0	0	0	8	4	0	0	27	0	2	0	14	4
30	47	2	0	0	5	0	13	0	2	1	1	0	9	1	0	0	40	1	2	0	20	8
Mai — May 7	44	2	1	0	4	1	5	1	3	0	0	0	20	5	0	0	30	0	7	0	23	10
14	38	2	0	0	3	0	4	0	3	1	1	0	10	4	0	0	44	2	5	3	17	6
21	32	1	1	0	6	0	5	1	0	0	0	1	11	5	0	0	28	0	0	1	18	5
28	61	2	0	0	3	0	3	2	0	0	0	0	11	4	1	0	29	0	7	1	26	12
Juin — June 4	43	2	0	0	5	0	8	1	1	0	1	0	5	3	1	0	17	0	4	3	13	5
11	42	2	0	0	7	1	4	1	2	1	1	0	4	4	0	0	39	0	6	1	20	13
18	62	5	0	0	11	0	3	1	2	0	1	0	14	3	1	0	22	0	1	0	18	14
25	69	2	0	0	5	0	3	0	9	0	0	1	10	7	0	0	33	0	6	1	17	11
Juillet — July 2	56	1	0	0	4	1	9	0	21	2	1	0	26	3	0	0	33	0	7	2	17	14
9	60	2	0	0	7	0	3	0	50	7	2	2	33	6	0	1	23	0	4	0	18	9
16	65	2	0	0	4	0	4	0	88	12	1	0	42	11	0	0	18	0	1	0	19	9
23	49	5	0	0	10	0	2	1	149	35	0	0	22	6	0	0	27	0	4	1	25	12
30	50	2	0	0	5	0	2	1	144	20	1	0	30	3	0	0	43	0	2	0	20	14
Août — August 6	34	3	3	1	5	0	10	1	119	28	1	1	36	8	0	0	23	0	1	0	16	11
13	40	0	0	0	3	0	8	1	187	28	0	1	31	7	0	0	18	0	5	2	17	13
20	30	1	0	0	3	0	1	0	121	24	0	0	44	10	0	0	27	0	1	2	28	14
27	25	0	0	0	3	0	0	1	20	26	0	0	26	13	0	0	13	0	5	1	18	12
Sept. — Sept. 3	32	0	0	0	2	1	3	0	57	6	0	0	29	5	0	0	22	0	6	2	22	11
10	29	0	0	1	7	0	3	0	31	2	0	0	21	13	0	0	22	0	2	0	20	9
17	19	0	1	0	2	0	3	0	18	8	1	0	20	10	1	0	20	1	1	0	21	8
24	32	2	2	0	1	0	3	0	7	3	1	0	26	5	0	0	18	0	2	0	17	11
Oct. — Oct. 1	26	2	2	0	3	0	3	0	9	6	0	0	16	9	1	0	33	0	5	0	17	8
8	30	0	4	0	1	0	3	1	5	1	3	1	12	2	0	0	20	0	2	1	25	9
15	18	1	0	0	3	0	4	0	2	1	0	0	8	4	0	0	17	0	3	0	21	15
22	18	0	7	1	5	0	3	0	6	1	2	1	16	1	0	0	20	0	2	1	23	7
29	44	1	1	3	7	1	7	1	4	0	0	0	10	5	1	0	19	0	3	1	19	12
Nov. — Nov. 5	25	1	1	0	8	1	7	0	5	1	1	1	13	4	0	0	19	0	0	0	19	9
12	25	0	2	1	5	0	2	0	7	0	1	1	22	4	0	0	16	0	3	0	20	8
19	25½	1	5	0	4	0	5	0	8	0	2	0	18	7	0	0	26	0	0	0	19	9
26	32	1	2	0	0	0	3	0	6	3	0	0	12	6	0	0	23	0	1	4	29	13
Déc. — Dec. 3	30½	3	0	2	5	0	4	0	4	0	4	1	9	6	1	0	19	0	5	1	15	9
10	27	0	2	0	2	0	9	2	1	0	1	0	13	4	0	0	15	0	4	1	19	12
17	27	0	1	0	4	0	8	1	2	0	1	0	10	3	0	0	17	1	5	1	20	17
24	41	0	1	0	4	0	3	0	2	2	1	1	8	2	0	0	19	1	6	0	12	13
31	22	0	0	0	2	1	4	0	0	0	0	0	5	1	0	0	16	0	2	0	7	6

Autres maladies déclarées: — Other diseases declared:

	Anthrax / Anthrax		Actinomycose / Actinomycosis		Botulisme / Food poisoning		Eclampsie / Eclampsia		Lèpre / Leprosy		Môle hydabiforme / Hydatids		Ophtalmie des nouveau-nés / Ophthalmia neonatorum	Tétanos / Tetanus		Trachome / Trachoma	Variole / Smallpox	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	C.	D.	C.	C.	D.
1919	1	1	—	—							45	10	24	—	10	7	—	—
1920	1	1	1	0							45	6	48	15	15	10	95	0
1921	2	—	2	2	1	—			2	—	36	15	35	21	14	12	2	0
1922	2	1	1	0	4	2			—	—	36	8	26	22	9	7	0	0
1923	0	0	2	1	10	0	39	2	0	1	30	2	27	19	7	5	0	0

A. Déclaration obligatoire depuis le 20 mai 1919. — Declared notifiable disease on May 20th, 1919.
B. Depuis le 1er juillet 1920, seulement ces trois variétés de grippe sont à déclaration obligatoire. — Only forms of influenza notifiable since July 1st, 1920.

* Cas, total pour 6 mois (juillet-décembre); décès, total pour l'année entière. — Cases, total for 6 months; deaths, total for the entire year.

Pas de cas de choléra asiatique, dengue, fièvre jaune, peste ou de typhus exanthématique, 1919-1923.
No case of Asiatic cholera, dengue, yellow fever, plague or typhus, 1919-1923.

MALADIES A DÉCLARATION OBLIGATOIRE DANS DIFFÉRENTS PAYS DU MONDE

ce: Le chiffre qu'on trouve après le nom de chaque pays indique la source de nos renseignements: (1) Liste officielle; (2) Rapport spécial; (3) Enquête sanitaire; (4) périodiques de morbidité.

| MALADIES | EUROPE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | AFRIQUE — AFRICA | | | | | | | | | | | | | | | | | | |

NOTIFIABLE DISEASES IN VARIOUS PARTS OF THE WORLD

The number after the name of each country indicates the source, as follows: (1) Official list; (2) Special report; (3) Sanitary survey; (4) Current reports of cases.

| AMÉRIQUE — AMERICA | | |

HTC
1924[10]

[*Communicated to the Council, the Members of the League and the Delegates at the Assembly.*]

A. 22. 1924. III.
[C. H. 214.]

LEAGUE OF NATIONS

Geneva, July 1924.

HEALTH ORGANISATION

Report of the Health Committee of the League of Nations

to the

PERMANENT COMMITTEE OF THE OFFICE INTERNATIONAL D'HYGIENE PUBLIQUE

In accordance with its Statutes, the Health Committee of the League of Nations has the honour to transmit to the Permanent Committee of the Office its first annual report (1923-1924.)

I. — Formation of the Committee.

1. In pursuance of the agreement concluded between the League of Nations and the Office international d'hygiène publique for the formation of a health organisation which would act as a technical advisory body to the Council and Assembly, the Committee of the Office, on October 27th, 1923, elected nine members of the Health Committee, namely: Sir George Buchanan, Dr. H. Carrière, Surgeon-General H. S. Cumming, Dr. A. Granville, Dr. A. Lutrario, Dr. P. Mimbela, Dr. L. Raynaud, Professor Ricardo Jorge, and a Japanese member (Dr. Tsurumi, subsequently nominated).

The Chairman of the Standing Committee of the Office, M. O. Velghe, is *ex officio* a member of the Health Committee of the League of Nations.

2. Six other members were then appointed by the Council of the League of Nations, in consultation with the Chairman of the Provisional Health Committee, on December 13th. 1923. The members appointed by the Council are: Professor Léon Bernard, Dr. C. Chagas, Dr. Jitta, Dr. T. H. Madsen, Professor D. Ottolenghi, and Professor G. Pittaluga.

3. The Committee completed its membership by the nomination of four additional members — Dr. Chodzko, Dr. Nocht, Dr. Alice Hamilton (February 11th, 1924), and Dr. Cantacuzène (May 7th, 1924), who is the representative on the Health Committee of the International Red Cross Committee and the League of Red Cross Societies. These appointments were approved by the Council of the League of Nations.

The Committee thus appointed will hold office for three years.

4. At the 1st Session of the Health Committee in February 1924, it was agreed that representatives of the International Red Cross Committee and the League of Red Cross Societies should be entitled to attend the meetings of the Health Committee when the agenda included any question which might concern them.

5. At its first session (February 1924), the Committee adopted Rules of Procedure (see Annex). Professor Madsen was elected Chairman for three years. It was also decided that the Chairman of the Office International d'Hygiène publique should, *ex officio*, be Vice-Chairman. Two Vice-Chairmen, not eligible for re-appointment during the life of the present Committee, are elected annually.

Surgeon-General Cumming and Sir George Buchanan were elected Vice-Chairmen.

6. The following are the special Commissions appointed by the Health Committee, with lists of their members :

Malaria.

Dr. Lutrario (Chairman).

Dr. Nocht.
Professor Ottolenghi.
Professor Pittaluga.
Dr. Raynaud.

Experts :

Colonel S. P. James.
Professor Marchoux.

Cancer.

Sir George Buchanan (Chairman).

Dr. Lutrario.
Dr. Jitta.
Professor Léon Bernard.
Dr. Carrière.

S.d.N. 2250 (F.) + 1700 (A.) 7/24. Imp. J. de G.

Committee of Experts on Sleeping-Sickness and Tuberculosis in Equatorial Africa.

Dr. Andrew BALFOUR (Chairman).
Dr. E. van CAMPENHOUT.
Professor Gustave MARTIN.
Dr. A. G. BAGSHAWE.

Note. — This Committee, with the exception of Dr. A. BALFOUR and the addition of
Professor Ricardo JORGE.
Dr. A. GRANVILLE,
Professor OTTOLENGHI,
Dr. RAYNAUD,
forms the Mandates (Health) Committee.

Far East.

Dr. JITTA (Chairman).
Sir George BUCHANAN.
M. VELGHE.
Surgeon-General CUMMING.
Professor Ricardo JORGE.
Dr. MIMBELA.
Dr. RAYNAUD.
Dr. TSURUMI.

Opium.

Dr. CARRIÈRE (Chairman).

M. VELGHE.
Dr. CHODZKO.
Professor NOCHT.
Professor Ricardo JORGE.

Training in Public Health.

Professor Léon BERNARD (Chairman).
Dr. MADSEN.
Dr. CHODZKO.
Professor OTTOLENGHI.

Corresponding Members :

Professor W. H. WELCH.
Sir George NEWMAN.
Dr. Andrew BALFOUR.
Dr. STAMPAR.

Waterways.

Dr. CHODZKO (Chairman).

Dr. LUTRARIO (Rapporteur).
Dr. CARRIÈRE.

Proposal of Dutch Government on Free "Pratique" in Ports.

Dr. JITTA (Chairman).

Surgeon-General CUMMING.
Sir George BUCHANAN.
Dr. CHAGAS.
Dr. LUTRARIO.
Professor NOCHT.
Dr. RAYNAUD.
Dr. TSURUMI.
Dr. MIMBELA.

Mixed Committee on Industrial Hygiene.

Health Committee Members :

Professor NOCHT.
Dr. RAYNAUD.
Professor OTTOLENGHI.

International Labour Office members :

Dr. GLIBERT.
Dr. LEGGE.
Dr. LORIGA.

Standardisation of Sera and Biological Products.

Dr. MADSEN (Chairman).

Professor NOCHT.
Dr. H. H. DALE.
Dr. McCOY.
Professor CALMETTE.

7. In the course of the year, the Committee appointed Sir George Buchanan an honorary member of the "Court of Governors" of the London School of Hygiene. It appointed Professor Léon Bernard to represent it at the International Conference on Tuberculosis which was held at Lausanne on August 5th.

DOCUMENTATION.

Internal Organisation.

Minutes of the First Session of the Health Committee, held at Geneva, February 11th, 1924 (C. 10. M. 7. 1924. III), page 6.
Rules of Procedure of the Health Committee (C. H. 197).

Note. The documents of the Health Organisation are composed as follows : Minutes of the sessions of the Health Committee and their annexes ; certain reports published in book form (Far Eastern Report, by Dr. Norman White) ; various manuals concerning, for example, the health organisation of a country (Denmark).

II. — Measures against the Spread of Epidemics.

8. The Health Organisation, in conformity with the decisions of the Council and Assembly, has the duty of assisting national Governments in combating epidemics. Work in this connection, directed against the westward spread of infectious diseases from Eastern Europe, was for some years undertaken on lines laid down by the Committee and previously reported. It has now entered upon a new phase since the danger of the spread of epidemics in Eastern Europe has become less serious.

9. In Russia, the Epidemic Commission assisted a Russian Scientific Committee appointed by the Moscow Public Health Board to enquire into the efficacy of buccal vaccination against dysentery, cholera, typhoid and paratyphoid.

10. The instructional courses arranged in Eastern Europe by the Epidemic Commission, in pursuance of a resolution adopted by the Warsaw Conference and with the aid of a grant from the League of Red Cross Societies, were held at Warsaw, Kharkov, and Moscow. The series of courses given at Moscow between October 1923 and the spring of 1924 were particularly well organised. Lectures were given by Dr. E. Burnet, of the Tunis Pasteur Institute, and Professor Roesle, of Berlin.

The programme included lectures on epidemiology, sanitary technique and social hygiene, together with practical work and visits to medical institutions. These courses were found to be of such value that the People's Commissariat for Public Health has expressed the hope that further grants will be forthcoming which will enable them to be repeated.

11. In January 1924, at the invitation of the People's Health Commissariat, the Health Organisation, represented by Dr. Norman White, Chief Commissioner of the Epidemic Commission, took part in the Pan-Russian Conference on Malaria at Moscow, which was attended by over 500 medical officers from all parts of Russia.

12. Continuing to maintain close touch with the endeavours made in Russia to cope with epidemics, the Epidemic Commission sent a special representative to the Pan-Russian Congress on Epidemiology, Bacteriology and Public Health, held at Leningrad at the end of May, at which all the most important medical problems were discussed.

13. The Warsaw Office of the Epidemic Commission has been closed, and the Commission has been able to transfer its activity to other fields.

14. Owing to the large movements of population which have taken place in the Near East, and to the fresh epidemic outbreaks which have resulted, Dr. Gauthier and Dr. Wroczynski, members of the Epidemic Commission, were appointed, at the request of the Greek Government, to carry out a vaccination campaign in Greece. Dr. Gauthier's report has been published. The number of vaccinations carried out is :

Against	smallpox	1,262,889
»	cholera and typhoid	651,680
»	plague	93,243
»	dysentery	29,880
»	typhoid (buccal administration of vaccine)	3,900

15. Owing to the extreme gravity of the health situation in Persia, the Persian Government applied to the League of Nations for the services of an expert to examine the conditions under which an epidemic campaign might be organised in Persia. Dr. John Gilmour, who was appointed for this purpose, left for Teheran on June 13th, 1924.

16. Since the presentation of Dr. Gauthier's Report on Grece, the Greek Government, owing to the increase of malaria, has asked the Committee to send a mission of enquiry.

Dr. Norman White, Chief Epidemic Commissioner, investigated this serious question in June and July last ; the results of his enquiry will be submitted to the Health Committee.

17. At the request of the Albanian Government, Dr. W. E. Haigh was appointed to carry out a preliminary enquiry in July and August 1923 into the prevalence of malaria in Albania. The Albanian Administration subsequently applied to the League of Nations for the appointment of a technical adviser, and the Committee again appointed Dr. Haigh, former Epidemic Commissioner, for a period of six months, in the course of which he will make a thorough study of the epidemic problem in Albania. Dr. Haigh's report will be submitted to the Malaria Committee, which, after considering it, will decide what recommendations can be made to the Albanian Administration.

The Problem of Malaria. — A list of the members of the Commission has already been given.

In addition, the following corresponding members assist the Commission in its work :

Dr. Raynaud (France — Member of the Health Committee)
Professor Léon Bernard — do. do.
Professor Marchoux (France)
Professor Marcinowski (Russia)
Dr. Anigstein (Poland)
Dr. Moutoussis (Greece)
Dr. Markoff (Bulgaria)
Professor Cantacuzene (Roumania — Member of the Health Committee)
Professor Ciuca (Roumania)
Professor Swellengrebel (Netherlands)
Dr. Sfarcic (Kingdom of the Serbs, Croats and Slovenes).

18. The problem of malaria affects very closely a considerable number of countries, for which anti-malaria measures are of first importance. These countries are accordingly represented on the Malaria Commission. By appointing expert members and corresponding members to the Commission, on the lines adopted in other cases, the Health Committee has collected a body of qualified research workers to co-ordinate the work done, including epidemiological research, on the subject with which the Commission has to deal.

19. It was decided that the local conditions of malaria in European countries should first be investigated. In order that the Commission might itself determine the programme of its subsequent work on the most useful lines, and might be in a position to give practical advice to public health departments, it was felt to be essential that the Commission should visit the malarial countries, and should collectively make a first-hand examination of the epidemiological situation and of the difficulties with which the various public health services are faced.

The Commission's duties were defined as those of "examining the information collected with regard to the epidemiological malaria situation throughout the world, and particularly in Europe, and the different prophylactic measures used, or which might be used, to combat this disease, and, lastly, of preparing the replies to questions regarding these problems which might be asked by the health administrations of the different States.

"With a view to carrying out its task, this Sub-Committee might co-opt experts of different nations, borrowing them either from public services or from scientific circles. These experts might be entrusted by the Sub-Committee with local enquiries, or any other research work which might assist them in carrying out their duties. The necessary measures for carrying out this work shall be entrusted to the competent services of the Health Section of the League of Nations."

The Malaria Commission's tour will last from May 31st to the end of August. The Commission is at present in Russia, having already visited the Kingdom of the Serbs, Croats and Slovenes, Greece, Bulgaria and Roumania. A visit to Italy will conclude the tour. In the course of its journey it has got into touch with the public health services of the countries through which it has passed. These bodies have greatly appreciated the promise of future co-operation which the Commission's presence in a country represents, and the Commission has been cordially welcomed by the Governments, which have given it every possible facility. The Health Committee takes this opportunity of offering them its thanks.

20. On the conclusion of its journey, the Malaria Commission will submit a report to the Health Committee; it is hoped that this report will contain most valuable information on malaria.

The success of anti-malarial measures, on the large scale on which they are required, depends in a very great measure on the extent to which quinine and cinchona derivatives can be made available — a problem including many intricate pharmacological, botanical, trading and economic considerations which must be surveyed as a whole and from the point of view of world output.

Four specialists — Sir David Prain, Professor Martinotti, Professor Giemsa and Professor Perrot — have kindly undertaken, on behalf of the Malaria Commission, to collate the most recent data on this subject. These specialists form an expert committee whose duties are to enquire into the world's quinine requirements, the present output and means of increasing it, the extension of cinchona cultivation to new countries, cost and sale prices, State distribution, and sale by private traders. It was decided that the enquiry should cover all the cinchona alkaloids.

21. The Malaria Commission having considered a proposal for the holding of an international quinine conference, it was decided that the questions requiring to be considered at such a conference should first be specifically defined in the light of the data thus obtained.

Sleeping-Sickness. — 22. The Committee of Enquiry on Tuberculosis and Sleeping-Sickness in Equatorial Africa (Chairman, Dr. Andrew BALFOUR) submitted, at the sixth session of the Provisional Health Committee in May 1923, a comprehensive preliminary report dealing with the existing epidemiological data as to the incidence of these two diseases in the French, Belgian, and British possessions in Africa, and as to the preventive and curative agents available there and the results obtained from the accepted methods of treating sleeping-sickness. The enquiry is admirably illustrated by maps attached to the report. The Committee hopes to submit recommendations to the Health Committee when it has received all the replies which it is awaiting.

The experts will submit for the Health Committee's decision a recommendation regarding a Health Convention between contiguous colonies, the object being to subject natives passing from one colony into another to medical supervision and treatment. The Sleeping-Sickness Committee's report will enable the Health Committee to appreciate the value of the available documentation bearing upon the comparative efficacy of the various recent discoveries in chemo-therapy.

Reports submitted by the Mandates Commission (Health). — 23. In accordance with a resolution of the fourth Assembly, the members of the Expert Committee on Sleeping-Sickness, together with three members of the Health Committee, considered the reports on the administration of mandated territories forwarded by the Permanent Mandates Commission.

The investigation of health conditions in certain mandated territories is thus now in progress. The Committee's attention had already been drawn to the increase in venereal disease in a large number of those countries.

Mission of Epidemiological Investigation in the Far East. — 24. On the conclusion of his mission in the Far East in January 1924, Dr. Norman White submitted a report to the Health Committee, which the latter discussed. It was a proposal by the Japanese member of the Provisional Health Committee that led the Committee to decide, with the approval of the Council and Assembly, that a mission should be sent to the Far East. It is well known that the Governments of Far Eastern countries are seriously troubled by the existence in that part of the world of endemic plague centres and are constantly engaged in preventing the spread of epidemics. The unco-ordinated condition of health regulations in those countries seriously hampers international traffic and leaves the Western countries under a constant threat of plague epidemics. The sanitary measures which are taken to deal with this danger are not always so definite or so well adapted to their purpose — and therefore not so restricted and economical — as they might be if the various Public Health Departments were notified with all due speed of the exact condition of public health in the Far Eastern ports. Dr. Norman White visited these ports, and describes their characteristic sanitary conditions in his report. He also draws attention to the directions in which better co-ordination between sanitary administrations of different ports seems to be needed. His journey led to many practical conclusions, both in the domain of science and in that of international health. These conclusions were discussed by a special commission and by the Health Committee itself.

The Commission's work on a draft health convention for Far Eastern countries is dealt with below.

25. One of Dr. Norman White's recommendations was that a Bureau for Epidemiological Intelligence should be established in the Far East. The Committee adopted the proposal, defined the duties and sphere of action of the Bureau, and proposed its establishment to the Council. The Council instructed the Health Committee to consider what would be the best situation for the Bureau, and to consult the Governments concerned. On the Committee's proposal, the Council decided that the Bureau should be established at Singapore. Its duties were defined as follows :

> "To collect and transmit at regular intervals, from all Far Eastern countries, information regarding the incidence and spread of infectious diseases, especially in ports and their hinterland ;
>
> "To collect and transmit periodical returns of vital statistics, etc., in Far Eastern ports ;
>
> "To collect data regarding alterations, additions or amendments to sanitary laws and regulations and regarding measures taken to combat transmissible diseases and to prevent their propagation ;
>
> "To publish at regular intervals returns, data tables, and general vital statictics regarding Far Eastern countries ;
>
> "To transmit all the above-mentioned information periodically to the ports and health administrations of all the Far Eastern countries concerned, and also to the Health Section of the League of Nations, whose duty it would be to communicate them to the Office international d'hygiène publique and to the various health administrations ;
>
> "To render all possible assistance to the Governments concerned in matters which fall within its competence."

As its duty will be to collect information from various ports on the Asiatic continent, and as it will be in constant communication with the administrations of the Far Eastern countries, the Bureau will be in a favourable position to assist in securing uniformity, so far as possible and desirable, in the methods employed by those administrations, and in any case to supply Asiatic and European health authorities with these particulars in a form which will facilitate comparison.

It was understood that the establishment of a Bureau should not involve the League of Nations in any expenditure. The Health Committee approached the International Health Board of the Rockefeller Foundation, which generously placed at the disposal of the Health Organisation a sum of 50,000 dollars for the first year and 125,000 dollars for a period of five years to defray the initial cost of equipping and opening the Bureau. As the League of Nations cannot accept such a gift except on condition that it is not thereby pledged to incur any subsequent financial outlay, it will be important at an early stage to consider the possibility that the Far Eastern administrations may subscribe to the Epidemiological Intelligence Service of the Bureau, which could then, to an increasing extent, cover its expenditure out of income. In any case this expenditure will be to a large extent made good by the simplification of health regulations, which will enable a system of full and rapid epidemiological intelligence to be established. The Bureau should thus represent an actual international saving.

Epidemiological Intelligence and Statistics. — The Singapore Bureau will form an extension to the Far East of the Epidemiological Intelligence Service of the Secretariat of the League of Nations at Geneva.

26. The Service of Epidemiological Intelligence and Public Health Statistics, which was created in 1921, has been developed since 1923, thanks to a special grant made by the International Health Board of the Rockefeller Foundation. Its programme of work is as follows :

(*a*) Study of the simplest and most reliable methods of obtaining information regarding the incidence of disease and the progress of epidemics.
(*b*) Comparative study of public health statistics of different countries.
(*c*) Study of the world distribution of particular diseases.
(*d*) Comparative study of the incidence of particular diseases in different countries and their public health statistics, with a view to determining the nature and practical significance of observed differences between them.
(*e*) Study of the periodicity of epidemics and the factors which cause or influence such periodicity.
(*f*) Organisation, with the concurrence of the public health administrations of the countries affected, of missions of enquiry regarding the development of epidemics, or for other purposes referred to in the preceding paragraphs.
(*g*) The publication and distribution of special reports and periodical bulletins.
(*h*) The review of the public health of the principal countries of the world, with a view to the issue, if circumstances permit, of reports on the subject as a whole.
(*i*) The organisation of a rapid interchange of information in regard to particular diseases in cases in which immediate action appears to be necessary.
(*j*) The employment at headquarters or elsewhere of experts provided with requisite assistance and technical equipment.

A survey of the activities of this service shows that its principal tasks have been :

(*a*) To extend its sources of information ;
(*b*) To ensure the comparability of its information ;
(*c*) To ensure its rapid circulation.

The accomplishment of this programme must of necessity be spread over a long period. It has had to be accompanied by systematic study of the comparability of the different data as furnished by different countries, *i.e.* inquiries which may be termed "methodological".

Statistical Methodology. — 27. The Committee has asked four groups of experts to investigate certain problems in the sphere of methodology :

1. — The possible methods of standardising the classification of causes of death :
Dr. Stevenson (Great Britain), Rapporteur ; Dr. Davis (U. S. A.) ; Dr. Rœsle (Germany) ; Dr. Rosenfeld (Austria).

2. — The selection of an arbitrary unit of population, by age and sex, on the basis of which the demographic statistics of certain countries may be organised :
Professor Niceforo (Italy), Rapporteur ; Dr. Würzburger (Germany) ; Professor E. B. Wilson (U. S. A.) ; Dr. Brownlee (Great Britain).

3. — The adoption of international statistical age and sex groups for causes of death :
Dr. Hansen (Denmark) ; Dr. Coats (Canada) ; Dr. R. Pearl (U. S. A.) ; Dr. Aschieri (Italy).

4. — A correct definition of "still-birth" :
Dr. Dudfield (Great Britain), Rapporteur ; Dr. Huber (France) ; Dr. Eardley Holland (Great Britain) ; Dr. Ney (Switzerland) ; Professor G. Hedren (Sweden).

The results obtained by these groups of experts will be submitted to the Committee, which will consider what practical recommendations should be made.

28. Moreover, it was extremely important to know exactly what statistical methods were in use in each national administration. We have accordingly undertaken to obtain and publish a series of statistical handbooks for different countries. Two volumes in the statistical methods employed and details entered in the civil register in the Netherlands and Belgium have been published with the aid of their expert officers. In the preparation of this series we have had the advantage of the services of Dr. Major Greenwood, of the British Ministry of Health, and Major Granville Edge. Other statistical handbooks are in preparation on Spain, Portugal, England and Wales.

29. In addition to the above, we have continued the work of preparing handbooks on the public health organisation of the Netherlands and Denmark to add to those we already possess on Austria and Hungary.

30. A third effort to improve and standardise epidemiological and demographical statistics is being made by the meetings of statisticians, the first of which took place at Geneva in October 1923.

Among the items on the programme of this meeting were : critical examination of the methods of death registration at present in use ; method of calculating the population between two censuses ; method of calculating the death-rate and statistics of birth and infant mortality, as well as several other questions of the highest importance from the point of view of medical statistics.

For the collective study of these questions the specialists under the health administrations of the following countries were appointed : Brazil, Bulgaria, Czechoslovakia, Hungary, Norway, Poland, Russia and the Kingdom of the Serbs, Croats and Slovenes.

It is propesed that the comparison of results as noted by the different administrations should be continued at further meetings, for which the programme has already been fixed.

This programme provides for the division of the questions to be studied into three groups. The first group will comprise the statisticians appointed by the administrations of the following countries : Esthonia, Latvia, Lithuania, Poland, the Kingdom of the Serbs, Croats and Slovenes, Czechoslovakia, Hungary, Roumania, Bulgaria, Russia and the Ukraine. The second group will comprise the representatives of Finland, Norway, Sweden, Denmark, Irish Free State, Scotland, England, the Netherlands, Germany and Austria, and the third group, those of Belgium, France, Spain, Portugal, Switzerland, Italy and Greece.

A Canadian representative will take part in the deliberations of the first and second groups, and the first group will reach Geneva on or about October 6th, for four weeks' work.

The first two weeks will be taken up by lectures delivered by members of the Health Section on the various aspects of notification of disease. The experts themselves will be invited to state the views of their countries on the subject.

Among the subjects of these lectures will be : General surveys of the organisation and work of the " Office international d'hygiène publique " and of the Health Organisation of the League of Nations, together with a number of questions connected with the notification of disease and the best methods to be employed.

The following are a few examples :

Tuberculosis : Essential data ; age and sex ; localisation and form of the disease ; first diagnosis ; torpid forms ; suspect cases ; movement of patients (hospital or home treatment).

Venereal disease : Method of notification ; legal aspects of the question ; insurance in relation to the notification of the diseases ; how to enlist public opinion in support of our efforts.

Diphtheria : Germ-carriers ; Schick's method ; employment of visiting nurses for notification of diseases ; legal obstacles ; interpretation of statistics ; death-rates, morbidity rates, arbitrary units of population ; development of epidemiological intelligence ; co-operation through bilateral and international conventions ; methods of co-operation between local and central offices ; their respective duties considered from the point of view of statistics ; value of incomplete statistical data.

It is hoped that it will be possible to organise a conference of specialists on other questions and that exchanges of views will follow. About two weeks will be devoted to visiting three or four epidemiological bureaux.

Publication of Information. — 31. However lacking in homogeneity it may be, the information that we receive cannot fail to be of great service, as the Health Section of the League of Nations is in direct and regular touch with 26 European States, 16 colonial administrations in Africa, 13 American countries, 12 administrations and towns in Asia, and also Australia and New Zealand, to say nothing of the epidemiological reports which it receives from certain large towns in Europe and from centres such as Hong-Kong which have a special geographical situation and are in touch with areas where the health organisation is still inadequate.

These epidemiological data are published by the Health Section in the following forms :

(1) A monthly report (monthly since October 1923) of which 68 numbers have appeared ;

(2) An annual report, first issued last year.

The epidemiological documentation received from health administrations is supplemented by making abstracts of numerous medical and health periodicals. All this information is classified in such a way as to render the data easily comparable from one period to another thereby rendering it easy to see what changes take place in the situation.

The method of classification which seems best suited to meet all requirements is the following :

For each country a special card is set aside for each disease in respect of which notification is compulsory and on this card all cases of the disease, and deaths therefrom, are entered in parallel columns. Two thousand cards of this kind are in daily use ; with a view to giving a wider range of comparison, particulars of previous cases are given in a series of tables annexed to these cards.

The accuracy of the data collected is constantly being checked.

We are continually urging on our correspondents the need for additional information and asking them to explain obscure points and fill in gaps in our documentation, and they have all responded readily and supplied the information we asked for with the greatest willingness.

If the publication of the reports is to have its full value, it is essential that information should be published as rapidly, concisely and clearly as possible.

The Epidemiological Intelligence Service has endeavoured to profit by the observations and criticisms to which the publication of the monthly report has given rise. Among the observations and suggestions which have been received, the following points may be noted :

(1) A general desire that information should be circulated more rapidly.

(2) The desirability of establishing a distinction, in the case of towns, between residents and non-residents ;

(3) Statistics to be collected also in regard to certain diseases the notification of which is not compulsory ;

(4) Our correspondents differ on the question of the death-rate ; it is thought that the wishes of the majority will be met by giving the figure of the population ;

(5) Publication of all periodical reports on mortality ;

(6) Would it be possible to give total figures in regard to certain diseases, notwithstanding the fact that the data received from different countries cannot be easily compared or added together, in consequence of differences in administrative organisation and accepted diagnosis ?

Any continued increase in the efficiency of the Intelligence Service depends, not only on the work of the Health Section, but also on the improvement of international liaison between health authorities.

32. The *Annual Report* contains a review of the epidemic position throughou the world, supplemented by a series of tables giving in respect of each country or colony :

(*a*) For each disease, the number of cases reported in each week, fortnight, ten days, or month, according to the procedure in use in the country ; similar figures for mortality, if possible.

(*b*) The total number of cases of each disease in the whole year.

(*c*) A summary of the last five years for each individual disease (when possible).

The *Annual Report*, moreover, contains special schedules in regard to a series of localities which have been specially affected, comparisons between the rates of incidence, and brief notes pointing out any constant features displayed by the statistical curves when they appear to us to be of special interest.

There has never been any intention of converting this annual report into a kind of critical analysis. Its sole purpose is to give in simple and clear form a rapid survey of the statistics of the year as compared with those of the previous years in all countries with which we are in correspondence.

Epidemiological Research and Special Statistics. — The special epidemiological researches which have been undertaken form part of a general programme of work contributing to the critical analysis of the value of notification in general.

33. Dr. SELIGMANN, of Berlin, has undertaken an enquiry into the value of the notification of *cerebro-spinal meningitis* in the countries of Northern Europe. This enquiry is taking place in very favourable conditions, as the cases are not very numerous and the diagnosis can nearly always be checked by bacteriological analysis. The results will be communicated to Professor MADSEN, who is carrying on a similar investigation in Denmark.

34. Dr. ROESLE is pursuing a similar investigation, under the same conditions, into the incidence of *scarlet fever and diphtheria* throughout the world. Dr. RUSSEL has been good enough to undertake the task of preparing a report on the endemic character of Asiatic cholera as it appears from a critical survey of the statistics.

35. Lastly, Dr. ROSENFELD, of Vienna, is studying the comparability of the statistics of *tuberculosis* in all its forms in the light of the methods employed by the various health administrations.

36. The Committee having been asked to collect detailed documents on *rhinoscleroma*, a letter was sent to the various public health services asking them to communicate any statistics they might possess on this subject. We have already received replies from seventeen countries, and a summary of the data they contain will be communicated to the Committee in due course.

37. The Third International Conference on *Leprosy*, held at Strasburg, recommended that the Health Organisation of the League of Nations should resume the periodical publication of special information regarding leprosy, and that the Statistical Service of the Health Organisation should collect information on this disease. The Committee decided that the Medical Director should publish epidemiological intelligence on leprosy, and that the publication of a manual by a qualified specialist should be considered later.

38. *The question of cancer* having been raised during the session of the Provisional Health Committee in June 1923, a Commission was formed with Sir George BUCHANAN as Chairman.

It was agreed that this Commission should study the possibility of making a thorough investigation of one of the aspects of the great problem of explaining the differences between the incidence of cancer and mortality therefrom in different countries [1].

Realising the necessity of moving gradually over this vast field of enquiry, the members of the Health Committee resolved at the outset that these differences should be exhaustively studied in three countries only, namely, Great Britain and the Netherlands, where social and health conditions are very similar, and Italy, where they are quite different.

The purpose of this investigation was to ascertain the causes of the considerable differences between these three countries, differences which have been noted during a long period of years, in regard to the mortality due to two forms of cancer — cancer of the breast and cancer of the uterus [2].

The Cancer Commission accordingly met at Paris in November 1923, and its report, indicating on what lines the investigation would be conducted, was communicated to the members of the Health Committee.

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[1] See below, *Documentation*, 38 (a).

[2] See below, *Documentation*, 38 (b).

Two important resolutions were taken at this meeting. It was decided (1) to study the details of national statistics, published or unpublished, in regard to cancer of the breast and uterus ; (2) to carry out and compare the results of a series of investigations, conducted on a definite plan, bearing on individual cases of these forms of cancer [1] as observed in hospitals selected for the purpose. In pursuance of this policy, a meeting of investigations engaged in the work took place at Rome on May 14th, 1924. It was attended by the three members (English, Dutch and Italian) of the Cancer Commission, and by a number of statistical and clinical experts appointed to study collectively the results obtained during the period of investigation to which reference has been made.

The minutes of these meetings in Rome, which lasted ten days, have been published (C. H. Cancer 5). Although the scope of these investigations had been carefully defined in advance, it became evident in the course of the meeting that the statistical data collected in regard to cancer of the breast and uterus could not usefully be compared until further individual researches had been made. At the end of the meeting, the statisticians decided to continue their investigations, and another meeting will be held to discuss them, probably in the autumn.

DOCUMENTATION.

Campaign against Epidemics.

8. Report on the Work of the Epidemic Commission, submitted to the Health Committee on February 13th, 1924. (Annex to Doc. C. 10. M. 7. 1924. III. p. 100).

8, 9, 11, 12. Rapport d'Ensemble relatif à la campagne de vaccination en Grèce. Dr. A. Gauthier, Commission des épidémies (C. H. 149). Janv.-Déc. 1923.

14. Note by the Persian Government on health conditions in Persia (Annex to Doc. C. 10. M. 7. 1924. III. p. 130).

16. Note by the Greek Ministry of Health concerning the despatch of a medical commission to enquire into the prevalence of malaria in Grece. (Annex to Doc. C. 10. M. 7. 1924. III. p. 129).

17. Request of the Albanian Government for the appointment for a medical adviser. (Annex to Doc. C. 10. M. 7. 1924. III. p. 128).

18. Reports by Dr. Lutrario on the work of the Malaria Committee presented to the Health Committee on February 19th, 1924, and May 9th, 1924 (Annexes to Doc. C. 10. M. 7. 1924. III. p. 127 and C. 213. M. 69. 1924. III. p. 27).

22. Provisional report of the Committee of Experts on Tuberculosis and Sleeping-Sickness in Equatorial Africa (C. 8. M. 6. 1924. III) presented to the 6th Session of the Health Committee, May 26th, 1923.

23. Extracts from Resolutions of the Fourth Assembly of the League of Nations (September 1923) and of the Council (December 1923) concerning the health reports submitted to the Permanent Mandates Commission (C. 10. M. 7. 1924. III. p. 75).

24. Report by Dr. Norman White on the prevalence of epidemic disease and port health organisation and procedure in the Far East .(C. 167. M. 43. 1924. III).

25. Report submitted to the Health Committee on May 10th, 1924, by Dr. Jitta, Chairman of the Commission appointed to consider the replies of the Governments on the establishment of an Epidemiological Intelligence Bureau in the Far East. (Annex to Doc. C. 213. M. 69. 1924. III. p. 28).

25. Report by Viscount Ishii to the Council of the League of Nations (June 17th, 1924) regarding the establishment of an epidemiological Bureau in the Far East and its cost. (C. 308. (1). 1924. III). (roneod).

26. Report on the Work of the Service of Epidemiological Intelligence and Public Health Statistics (Annexes to Doc. C. 10. M. 7. 1924. III. p. 102).

26. Reports by the Medical Director on the Service of Epidemiological Intelligence and Public Health Statistics (Annexes to Doc. C. 10. M. 7. 1924. III. p. 85).

28. The official vital statistics of the Kingdom of Belgium (C. H. 162).

28. The official vital statistics of the Kingdom of the Netherlands (C. H. 159).

31. Monthly *Epidemiological Report* of the Health Section of the Secretariat for the year 1924 (Nos. 59 to 69) which have been published regularly in addition to Epidemiological Reports Nos. 1-58 which appeared at irregular intervals.

31. *Epidemiological Intelligence* No. 7 — appearing annually from this number - Statistics of notifiable diseases in European countries for 1922, published in October 1923, continuation of preceding Nos. 1-6.

35. Report of the Sub-Committee on Cancer, presented to the Health Committee February 16th, 1924, (C. H. 177 Annex to C. 10. M. 7. 1924. III. p. 118).

35. Memorandum by Dr. Lutrario on statistical research on cancer now being carried on in Italy (C. H. 172).

35. Minutes of the Sub-Commission on Cancer, held in Paris, November 1923 (C. H. 137).

35. Minutes of the Meeting of Experts held in Rome May 14th, 1924 (C. H /Cancer /5).

Epidemiological Investigations and Vital Statistics.

38. (a) Report of the Sub-Committee on Cancer to the Health Committee, February 9th, 1924 (C.H. 177, Annex to Doc. C. 10. M. 7. 1924. III. p. 118).

(b) Memorandum du Dr. Lutrario sur les enquêtes statistiques sur le cancer en cours en Italie Doc. C. H. 172).

(c) Minutes of the meeting of the Sub-Committee on Cancer, Paris, November 1923 (C. H. 137 (1).

IV. — INTERCHANGES OF HEALTH PERSONNEL.

39. The object of the interchanges is to establish contact between the greatest possible number of public health officers in different countries, in order that they may gain experience of the methods employed by the public health services of other countries, to establish personal relations among those services, and thus to enlarge the opportunities for comparison, reflection and progress.

The cost of the interchanges has hitherto been met :

(1) By a contribution from the Budget of the League of Nations. In the 1924; Budget this contribution is 50,000 Swiss francs. The Supervisory Commission has consented to its being increased to 75,000 Swiss francs in the 1925 Budget.

[1] See below, *Documentation* No 38 (c).

(2) By a special contribution from the International Health Board of the Rockefeller Foundation. This grant, which was originally 60,000 dollars, a year for three years from october 1922 has been increased to 100,000 dollars for the year July 1924-July 1925.

The Health Committee asks that the appropriation in the League of Nations Budget for the financial year 1925 should be increased to 250,000 Swiss francs. The Council, in referring the question to the Assembly, whose Fourth Committee will consider the financial possibilities, has emphasised the importance which it attaches to the continuance of the interchanges.

40. The Health Committee has frequently been called upon to consider the interchanges in all their technical and psychological aspects.

The Sub-Committee's report, adopted by the Committee on February 14th, 1924, lays down the rules for the interchanges.

The following were the questions to be settled :

Ought the interchanges to include specialists or public health officers of no special qualifications ?

Ought they to take the form of individual missions only, or should collective interchanges be arranged ?

What qualifications should candidates be required to possess, and how should they be selected ?

Should each study tour deal with one or with several countries, and how should the countries be selected ?

How long should the interchange last, and what preparations and arrangements should be made for it ?

How many persons should take part in the interchanges ?

The Committee's decisions were as follows :

It expressed a preference for interchanges of public health officers of no special qualifications. There is a close connection between the different aspects of health problems, and most public health officers have to deal with practical questions of general hygiene. Certain special branches of hygiene, however, are of such great social importance that the Committee wished to offer opportunities of additional study to practitioners who have taken up those branches. Accordingly, in 1923 and 1924, travelling courses were held for the comparative study of methods of fighting tuberculosis.

The Committee agreed to set apart a number of personal grants to enable certain technical specialists to acquaint themselves with bacteriological methods requiring a course of instruction in one or more foreign laboratories, and to assist certain scientists to complete the epidemiological study of specified diseases.

In every case the Committee selected research workers whose subjects fell within the sphere of the Health Organisation.

Collective interchanges, however, can alone be of real assistance to the Health Committee in attaining its objects, and the Committee therefore decided to devote its efforts and its means chiefly to the preparation and organisation of such interchanges.

As regards the choice of candidates, it was essential that some selection should be made, since the Rockefeller Foundation is specially interested in the training of young public health officers. The Committee wishes the advantages of the travelling courses to be reserved as far as possible for medical officers who have influence with their national public health services. Experience seems to show that there are not too many of these officers for relations to be established between them and the Health Organisation. Candidates have to be nominated by their public health services. Their dossiers are sent to the Health Committee, which makes the final selection.

As regards the travelling courses, the Committee decided that, except in the case of certain interchanges reserved for specialists, where it might be necessary to review and compare the methods followed by different services, interchanges attended by public health officers of no special qualification should be so arranged as to deal with one country only. It seems essential that the attention of the participants should not be distracted or their work scattered. A detailed and methodical investigation is of greater value than a hurried and superficial enquiry.

The public health services which it is most important to bring to the notice of the participants in the interchanges may be divided into two categories — public health services of recent formation, dealing principally with certain special problems, and services with older traditions and more varied activities.

The experience of the early travelling courses seems to show that the normal duration of a course should be limited to ten weeks, as it would be difficult to keep the attention of the participants very much longer without tiring them.

We may mention that some of the early courses lasted much longer. For instance, the course in the United States lasted five months.

The arrangements for an interchange are made considerably in advance by the Public Health Department of the country, which is to act as host ; this department itself organises the lectures and visits, and prepares for publication a handbook on the medical establisments of the country. The Health Section is notified of all these arrangements.

On arriving in the country, the medical officers spend a week or two in attending theoretical lectures designed to give them a general idea of conditions in the country ; these lecures are attended by all the participants. This initial period is indispensable to establish contact between the participants themselves, and between them and the local officials. On the

conclusion of the course, the participants reassemble for a short time, preferably at Geneva, to discuss and review the impressions they have gained. Each member has to submit in person to his colleagues a report on his tour. Any of these reports which are of special interest may be published, with the consent of the Public Health Department of the country visited and of the author's own country, and with the agreement of the Health Committee. The other reports are kept by the Health Section as part of its documentary material.

In order to avoid crowding, the number of participants in each interchange is fixed at from 20 to 25. In the case of interchanges of specialists, the number is reduced to ten.

41. Since the last Assembly of the League of Nations, interchanges have taken place in the following countries :

1. *United States.* — The tour took place at the invitation of Surgeon-General CUMMING. The officials taking part assembled at New York on September 6th, 1923, accompanied by a representative of the Health Section. The first fortnight was spent in theoretical and practical studies, which took the form of visits to hospitals and to a number of hygienic and statistical institutions. The remainder of the course was split up into two periods — one in the Southern States, which are mainly agricultural, and the other in the Northern States, which are predominantly industrial. Before returning to Europe, the participants reassembled at New York, where general lectures were given with the object of co-ordinating the impressions gained, and describing the evolution of medical institutions in the United States and the part played by them in the general life of the country.

The party left for Europe on December 7th. Before the final conclusion of the course, a series of lectures was given at Geneva.

2. *Great Britain.* — From February 1st to April 12th, 1924 (25 participants representing 18 nationalities.).

3. *The Netherlands.* — From April 24th to May 30th, 1924 (25 participants representing 20 nationalities).

4. *Denmark.* — From June 1st to July 14th, 1924 (27 participants, representing 21 nationalities).

In all cases the Public Health Departments of the countries in which interchanges have been held have prepared, directly or by a suitable devolution, the courses with such care as to lighten considerably the burden of the Health Section. The Committee has pleasure in offering them its hearty thanks for their assistance, as well as to many individual hygienists and officials of local administrations and municipalities, whose aid has been invaluable.

The next interchange is to take place in Switzerland from August 10th to September 20th (20 participants, representing 13 nationalities). Preparations are being made for further interchanges, to take place in 1925, in Great Britain, Belgium, the Kingdom of the Serbs Croats and Slovenes, and Japan. The interchange in Japan will be reserved for Far Eastern public health officers. Interchanges of specialists are in contemplation in Sweden, Russia and France ; the special subjects studied will probably be maternity and child welfare and the campaign against infant mortality. This interchange of specialists will consist of medical inspectors of factories etc. who belong to central or provincial administrative bodies or to municipal health departments, and who have specialised in industrial health and pathology, as well as of medical officers of health of large urban areas.

Instruction in Public Health. — 42. At its February Session the Health Committee decided to appoint a commission to examine the question of instruction in health and social medicine in the different countries of Europe and of America and in Japan. Professor Léon BERNARD was appointed Chairman.

Like the organisation of interchanges, the appointment of this Commission is an expression of the Health Committee's anxiety to secure a progressive improvement and standardisation in public health procedure in the different countries.

IV. — HEALTH INSTRUCTION.

During the Provisional Committee's final session, the Medical Director was asked to institute an international enquiry into the giving of health instruction in different European and American countries and in Japan. The Health Section has collected details of the instruction given in a certain number of universities, and the Committee decided, at its meeting of February 20th, 1924, to appoint a special committee, with Professor Léon BERNARD as Chairman, to continue this enquiry, making its scope as large as necessary, and to make recommendations in favour of courses of study which in its opinion are most likely to yield the highest value in public health education both from the scientific and practical points of view.

DOCUMENTATION.

39. Report by the Medical Director (Annex to C. 10. M. 7. 1924. III. p. 90).

39. Resolution of the Health Committee of May 10th, 1924, recommending that the item for the liaison ervice between the public health administration, in the estimates for the Health Organisation should e increased to 250,000 francs (C. 213. M. 69. III. p. 18).

nterchange.

40. Report of the Sub-Committee, to the Health Committee on February 14th, 1924 (Annex to . 10. M. 7. 1924. III. p. 114).

41. Health Organisation in Denmark (Handbook) (C. H. /E. P. S. /49. 1924).
41. Health Organisation in the Kingdom of the Netherlands (Handbook) (C. H. /E. P. S. /48. 1924).
41. General Scheme of Interchanges adopted by the Health Committee February 14th, 1924 (C. 10. M. 7. 1924. Annex 6. p. 115).

V. — Standardisation of Sera and Biological Products.

43. As the work of standardising sera and serological reactions, which had been undertaken in the course of the preceding years, gave promise of considerable success, the Health Committee felt that a group of specialists from various countries should appointed to assist Dr. Madsen, who remains in charge of the research work in this field. The Health Committee accordingly appointed a Permanent Standards Committee composed of Dr. Madsen (Copenhagen), Chairman, Dr. McCoy (Washington), Professor Calmette (Paris), Professor H.H. Dale (London), and Professor Nocht (Hamburg).

This Committee, and the various laboratories which are assisting in the standardisation experiments, worked on three different subjects — the standardisation of sera, the standardisation of serological reactions and the standardisation of certain biological products.

44. In regard to sera, the Committee's first object was to determine the dosage of diphtheria antitoxin to be recommended for use in the treatment or prevention, as agreement had already been reached on the question of the international standard for this serum. In connection with the fixing of these quantities, a recommendation was approved by the Standards Committee at its session in May 1924. The standardisation of anti-diphteritic serum was thus effected in practice, and arrangements were made to enable institutes in all countries to apply to the Copenhagen Institute for a fresh test of their diphtheria standards on the basis of the international unit. The Copenhagen Institute has tested the American, German and British standards, which titration has shown to be identical.

45. As regards other therapeutic sera research, work has been carried on in the various institutes which are engaged on standardisation. These researches were chiefly concerned with anti-tetanic, anti-pneumococcic and anti-dysenteric sera.

In the case of anti-tetanic serum, the work which had already been done gave some ground for hoping that the question of its standardisation was finally settled. The most recent comparative titrations, however, have shown that there are still differences between the various standards ; but it appears from the work now in progress that the standardisation of this serum is practicable, and that only a few technical points have to be cleared up.

46. As regards anti-dysenteric serum, reports of the utmost importance have been drawn up by certain eminent specialists whose co-operation the Standardisation Committee has obtained. A meeting of scientists engaged in this research work is to be held at Geneva next September, and there is every reason to hope that, notwithstanding the theoretical and practical difficulties which have had to be overcome, an agreement will be reached as to the method to be followed in fixing an international standard.

47. The standardisation of biological reactions, particularly the Wassermann reaction and other syphilis reactions, was exhaustively discussed at a Technical Laboratory Conference held at Copenhagen in November 1923 at the Danish State Serum Institute. Dr. Madsen presided, and some of the most eminent serologists in Europe were present. This Conference may be regarded as putting the finishing touch to the work which had already been done in the various laboratories engaged upon the sero-reactions of syphilis. The resolutions adopted by the Conference form the basis of the questionnaire on the Wassermann reaction, which, at the Health Committee's suggestion, was sent to all Governments. This document emphasised *inter alia* the need for an official check on the Wassermann reaction, the importance of only allowing it to be carried out by duly qualified persons, and the possibility of carrying out of serological examinations free of charge. Replies have already reached us from 17 Governments ; some of these replies, particularly those of Germany, Norway, India and the United States, contain valuable suggestions, which will have to be considered later on.

In the course of the Conference, it became clear that working together in the laboratory was the only way to get rid of the slight differences of technique shown by different experimentists in carrying out the same reaction. The results obtained are therefore of great interest, since they pave the way for a new form of international co-operation through the laboratory. The foundation has thus been laid for a uniform technique, without which the results obtained in different countries cannot be comparable.

48. In regard to the standardisation of biological products, advantage was taken of the holding of an International Congress of Physiology at Edinburgh in July 1923, attended by the principal pharmacologists of all countries, to summon a technical Conference of Specialists on the Standardisation of Biological Products. This Conference drew up a scheme of work, and the co-ordination of the researches was entrusted to Professor H. H. Dale, of the National Medical Research Institute, London. Research was carried on with a view to discovering processes by which the action of certain medicaments and preparations of the endocrine glands could be accurately measured. The most extensive research was carried out on digitalis, pituitary extract, thyroid extract, the arseno-benzols, and insulin. The standardisation of insulin, on which work has been proceeding under the direction of Professor Dale, is very nearly accomplished ; this extract has been successfully prepared in a very stable form, and all that remains is to compare its action with that of the typical insulin preparation used in certain Canadian laboratories.

49. In regard to the titration of arseno-benzol derivatives, it seems unlikely that there will be any difficulty in reaching agreement, as the methods used in most countries are similar, and no question of principle arises.

Documentation.

Standardisation of Sera and Biological Products.

43. Report of the Technical Conference for Consideration of Certain Methods of Biological Standardisation, Edinburgh, July 19th-21st, 1923. (C. 4. M. 4. 1924. III).

44. Report by Dr Madsen on the Standardisation of Sera and Serological Tests (C. 10. M. 7. 1924. III. p. 125).

44. Procès-verbaux de la 1re Session du Comité permanent de Standardisation des Sérums, des Réactions Sérologiques et des Produits Biologiques, Paris 2-3 Mai 1924. (C. H. /S. S. / 1re Session P. V).

46. First and Second Report on the Standardisation of Dysentery Serum by K. Shiga, H. Kawamura and K. Tsuchiya (C. 177. M. 49. 1924. III and C. H. 193 (*a*)).

47. Report of the Technical Laboratory Conference on Investigations on the Serodiagnosis of Syphilis (C. 5. M. 5. 1924. III).

48. Interim Report by Prof. H. H. Dale on the investigations arising out of the International Pharmacological Conference held at Edinburgh July 19th-21st, 1923. (C. H. 152).

48. Report by Prof. H. H. Dale concerning the progress of investigations now in progress, on lines suggested by the International Conference at Edinburgh, July 1923. (C. H. 198 and Annex C. H /S.S./P. V. 1re Session).

VI. — International Conventions.

50. The task of the Health Committee is confined to the preliminary technical work involved in the preparation of public health conventions, the final adoption of these conventions being a matter for the administrations concerned, or, in the case of conventions of a general nature, for the Office international d'hygiène publique.

In the course of the work of technical preparation, the Committee necessarily has to decide on the procedure to be followed in utilising this preparatory work and in concluding the conventions ; the two principal problems with which it is faced in the process are the following :

1. The distinction to be drawn between measures of an international character rendered necessary by certain special problems directly affecting the relations between two countries or between a small number of countries, and measures of a general character to be applied to as many countries as possible. While it is most desirable to make the organisation of international health regulations as elastic as possible and to leave it to the countries concerned to settle among themselves questions arising solely out of their contiguity, it is equally important to avoid unnecessarily complicating international relations in the sphere of public health and setting up in different parts of the world different systems the divergences of which might tend to hamper traffic and exchange.

2. The satisfactory adjustment of public health measures with economic necessities and with the freedom of traffic.

On this point it should be remembered that the Health Committee, being part of the general organisation of the League of Nations, is in a specially good position to obtain the assistance of the other technical organisations of the League for advice or conference which may be desired by the public health experts.

51. In a resolution adopted on February 20th, the Health Committee recommended that Dr. Norman White's report should be communicated through the Secretary-General to the Governments of all the Far Eastern countries, and that the latter should be invited to offer observations on the draft health convention annexed to the report. A special Commission, with Dr. Jitta as chairman, was appointed to investigate the observations received from the Governments, and submitted a general report to the Health Committee on May 10th, 1924. The majority of the Governments, while reserving observations on the Convention proposed, favoured the immediate creation of an epidemiological intelligence bureau at Singapore.

52. The fourth Assembly, in a resolution adopted on September 15th 1923, approved the Council's decision authorising the Health Committee to examine the Dutch proposal regarding free "pratique". The object of the proposal was to facilitate international maritime traffic by the grant of certain privileges to vessels having obtained a clean bill of health in any port which is internationally recognised as having an adequate health organisation.

The Health Committee discussed this question at its meeting on May 10th, 1924. Some doubt was expressed as to the practicability of that part of the proposal which would have involved international surveillance of port sanitary administration, but the Committee agreed that Governments should be invited to conclude working agreements of the kind referred to in Article 41 of the International Convention of 1912. The Committee further expressed its willingness to afford all possible assistance to Governments desirous of having recourse to the mediation of the League of Nations in the event of the application of any of these conditions giving rise to difficulties.

53. In regard to the procedure for adopting conventions of a general character, the Committee wishes to draw the attention of the Office to a suggestion which it made to the Council of

the League of Nations, and which the latter accepted, in regard to the duties to be entrusted to the Office international d'hygiène publique ; it was proposed not only to make the Office responsible for the adoption of the final text of general international health conventions but also to authorise the members of its Standing Committee to sign such conventions on behalf of their Governments.

In view of the Council's acceptance of the proposal, a letter to this effect was sent to the French Government.

The Committee has had occasion to emphasise the great importance of finally settling the amended text of the International Health Convention, which forms the basis of all partial health agreements. A new text has been drafted by the Standing Committee of the Office international d'hygiène publique. This text should now be examined by an international health conference specially convened for the purpose. The Health Committee has drawn the attention of the Governments to the importance of this Conference being held as soon as possible.

54. As the outcome of the Warsaw Health Conference in March 1922, seven bilateral health conventions were concluded under the auspices of the Committee. Another convention between Austria and the Kingdom of the Serbs, Croats and Slovenes is now only awaiting the final diplomatic signatures.

55. Under the terms of the Treaty of Versailles, the Health Committee of the League of Nations has been asked by the Turkish Government to nominate three health advisers. The inadequacy of the technical and local information furnished by the Turkish Covernment has so far precluded the Committee from reaching any decision on this point.

56. At its February session, the Health Committee discussed the report of the Mixed Committee (Health Committee and Advisory Committee on Traffic in Opium) on the question of determining the requirements of the various countries in opium and its derivatives. The Provisional Health Committee had previously accepted the request of the Advisory Committee on Opium to aid it in this matter. The figure of 600 milligrammes of raw opium per head per annum, which had originally been adopted by the Mixed Sub-Committee, was reduced to a maximum of 450 milligrammes.

Documentation.

International Conventions.

51. Discussion and resolutions of the Health Committee at its meeting of February 15th, 1924, on the subject of a sanitary convention for the Far Eastern countries (C. 10. M. 7. 1924. III. p. 32).

52. Dutch psoposal regarding the Examination of Vessels in Ports (Annex to Doc. C. 424. M. 187.)

52. Resolution of the Fourth Assembly of the League of Nations concerning the Dutch proposal on "libre pratique" of vessels. (Records of the Fourth Assembly, Plenary Meetings, p. 56).

52. Note by Dr. Jitta on the Dutch proposal regarding the examination of ships in ports (C. 213. M. 69. 1924. III).

52. Resolution of Health Committee regarding the Dutch proposal. Approval of Draft Resolutions (C. 213. M. 69. 1924. III. p. 17).

55. Extract from the Treaty of Peace with Turkey concerning health matters (Part IV, Section II — Sanitary Questions — Annex to Doc. C. 10. M. 7. 1924. III. p. 117).

55. Letter dated October 25th, 1923, from the Minister for Foreign Affairs of Turkey to the President of the Health Committee asking that effect be given to the clause of the Lausanne Treaty. (Annex to Doc. C. 10. M. 7. 1924. III. p. 117).

55. Resolution of the Health Committee regarding the designation of three European doctors as sanitary advisers to the Turkish Government. (C. 10. M. 7. 1924. III. p. 52).

56. Note by Dr. Carriere on the work of the Mixed Sub-Committee of the Health Committee and the Advisory Committee on the Traffic in Opium. (C. 10. M. 7. 1924. III. p. 95).

56. Resolution adopted by the Health Committee on February 15th, 1924, regarding the legitimate requirements of opium (C. 10. M. 7. 1924. III. p. 40).

56. Report on the work of the Opium Commission and resolution adopted May 10th, 1924, by the Health Committee. (C. 213. M. 69. 1924. III. p. 14).

C. H. 209.

LEAGUE OF NATIONS.

HEALTH ORGANISATION.

Organisation

OF THE

Public Health Services

IN THE

Kingdom of the Netherlands

By Dr. N. M. JOSEPHUS JITTA,

Président of the Health Council.

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PREFACE

Health legislation and administration constitute one of many factors which) to form the public life of a nation. Unlike political institutions, health institutions) not arise out of an organic unity and cannot develop on a definite plan. The ıanges and innovations introduced in the course of years have, for the most part, :en made haphazard. The problems have arisen from the vicissitudes of life itself. ı short, the needs of the moment have determined the intervention of the legislator ıd of the administration. The health problem assumes very different aspects at fferent times and in different places.

The technical resources at the disposal of the various countries and the psychological factors involved have varied in every way and this has given a distinct character every health organisation. Consequently, it is a matter of great difficulty, even r health specialists, to form an accurate opinion on foreign health organisations ; and t the great complexity and ever-increasing number of international problems ith which we have to deal makes it essential to gain at once some knowledge of ese different institutions. Failing this knowledge, not only does co-operation become fficult but the opinion that may be formed regarding the condition of public alth in a given country is extremely liable to error.

Furthermore, information on disease obtainable from several different countries very difficult to compare, as it comes from such different sources.

An indispensable preliminary to any useful study of the problem is a process standardisation requiring the most thorough knowledge of the international health ministrations.

As the work of the Health Organisation of the League of Nations is strictly ternational, the primary aim of this body should be to remedy as far as possible e difficulties arising from the diversity of the sources of information. The Health ganisation has accordingly decided to publish a series of monographs describing e organisation and working of the health administrations of the different countries. r the writing of these reports it has enlisted the services of experts occupying portant positions in the various health administrations.

The original proposal was to make all these monographs conform to a fixed ttern. The Health Section of the Secretariat of the League of Nations accordingly

sent a note to the authors of these monographs framed with a view to obtaini reports which could be directly compared ; but the majority of the autho preferred to present their work in a less stereotyped form.

The series of enquiries which we have undertaken to publish deals with heal administration from the general standpoint only. We propose subsequently publish investigations on certain special points in the field of public health, whi will give additional and more detailed information on these points.

In publishing these general enquiries we have been greatly helped by the gen rous financial grants provided by the International Health Board of the Rockefell Foundation.

Geneva, July 1st, 1924.

HEALTH SECTION OF THE SECRETARIAT
OF THE LEAGUE OF NATIONS.

Organisation of the Public Health Services in the Kingdom of the Netherlands.

By Dr. N. M. JOSEPHUS JITTA,
President of the Health Council.

NOTIFICATION OF DISEASES.

The notification of diseases is provided for in Article 6 of the Law of June 1st, 865, which lays down rules concerning the exercise of the medical profession.

Article 6 provides : "On discovering the existence of a disease dangerous to blic health they [1] shall immediately, and at latest within theree days, inform the spector of their district responsible for supervising the application of the sent law, together with the burgomasters and aldermen of their commune".

(The information in question must be forwarded to the Inspector of Infectious seases in whose district the commune is situated.)

On being asked to name the diseases which constituted a menace to public alth, and in respect of which, therefore, notification was obligatory, the Minister the Interior in his Circular dated September 6th, 1866, replied in a more or less neral way as follows : "In my opinion, Article 6 of the Law of June 1st, 1865 *gal Gazette*, No. 60), makes it obligatory for doctors to notify *all cases of disease stituting a menace to public health. This definition only includes, therefore, epidemic eases.* I express this view without prejudice to the opinion of the judge in the nt of proceedings being taken in respect of an infringement of the said Article".

In practice, a relation has been established between this law and Article 1 of Law of December 4th, 1872 (*Legal Gazette*, p. 134), which lays down various asures for the prevention of infectious diseases — a law which has subsequently n modified on several occasions.

Under the terms of Article 1, the law is applicable to the following diseases :

Asiatic cholera ;
Typhus and typhoid fever ;
Smallpox (variolæ, varioloids) ;
Scarlet fever ;
Diphtheria ;
Dysentery ;
Plague.

(For details see below, under the heading "Legislation against Infectious eases".)

[1] *I.e.*, the doctors.

Article 16 of the Law of December 4th, 1872, reads as follows :

"Without prejudice to the notification to be made to the inspector in accordan with Article 6 of the Law of June 1st, 1865 (*Legal Gazette*, No. 60), any doctor w discovers a case of Asiatic cholera, smallpox or plague shall communicate the fa within 24 hours to the burgomaster of the commune in which he has discover the patient.

"The burgomaster shall immediately forward a copy of such notification the inspector."

It is further provided in Article 19 of this law :

"All heads of households, lessees (male or female) of night-shelters or lodgin houses and masters of vessels calling at ports situated within any commune, and t directors of such charitable institutions as are referred to in Articles 1 and 2 of t law concerning public assistance, and of prisons, reformatories, public penitentiari workhouses and lunatic asylums, shall inform the burgomaster, within 24 hou after discovery, of any case of infectious disease which has occurred on the premis in question.

"The same regulation shall apply to the commanding officers of army corps warships stationed in any port, in respect of all barracks, vessels, etc., placed und their control."

NOTIFICATION OF OCCUPATIONAL DISEASES.

The notification of occupational diseases is regulated by Article 82 of the *La of* 1919 *concerning Labour*. This article reads as follows :

"1. All doctors are required to notify, in writing, the Minister, or one of t officials designated by him, of any cases which he may be treating of certain diseas enumerated in a general administrative regulation. The general regulation ma in respect of all or some of these diseases, restrict obligatory notification to cases i which the patient is or was employed during a certain period previous to the beginnir of medical treatment in certain enterprises specified in the general regulation.

"2. The general administrative regulation shall determine in detail the mann in which the obligation imposed in the preceding paragraph is to be carried out an may provide for the payment of a fixed sum in respect of each notification".

The general administrative regulation referred to above was issued in 1920 viz., the Order of October 4th, 1920 (*Legal Gazette*, No 773), which constitutes a gener administrative measure as provided for in Article 82 of the Law of 1919 concernin labour.

Objects which it is desired to have examined free of charge may be forwarded
the *Central Laboratory* established at *Utrecht* for the requirements of official public
ealth supervision (opened on May 2nd, 1910).

Any practitioner may make application, free of postal charges, to the director
the laboratory for the wrappings which he requires for the consignments. The
boratory possesses different kinds of wrappings : for sputum and urine, particularly
ith a view to discovering tuberculosis bacilli ; for matter obtained by scraping
ie nose, the throat or other organs, with a view to discovering diphtheria bacilli ;
r (excrements) urine and blood, with a view to discovering the presence of typhus
id similar diseases ; for blood and spinal fluids, with a view to testing the Wassermann
action, or to carrying out any other examination of the cerebral spinal fluids ; and
r blood preparations, with a view to discovering the presence of malaria.

As soon as the result of the examination is known, the doctor is informed by
ter or telegramm. If the examination relates to an acute infectious disease and
ves a positive result, the result is communicated to the Inspector of Public Health
ncerned.

A "Table of Notified Cases of Infectious Diseases" (as provided for in the Law
December 4th, 1872 (*Legal Gazette*, No. 134), as finally amended by the Law
November 27th, 1919 (*Legal Gazette*, No. 784), will be published *weekly*, in the
rm of an Annex to the Dutch *Legal Gazette*.

This table is drawn up at the offices of the Health Council, with the help of data
pplied by the Inspectors of the Public Health Supervision Department.

The number of cases which have occurred of the diseases mentioned in Article 1
the Law of December 4th, 1872, and of the diseases to which this law has been
clared to apply for a period of one year, will be stated every month in the "Verslagen
Mededeelingen betreffende de Volksgezondheid" (Reports and Communications
ncerning Public Health).

NOTIFICATION OF BIRTHS AND DEATHS.

Under the terms of Article 29 of the Civil Code, notifications of births must be
ade to the registrar of the commune in the presence of two witnesses within three
ys of delivery. The registrar must immediately record the notification. He is
titled to demand that the child be shown to him.

Article 30. "The notification of the birth of a child must be made by the father,
failing him by the doctors, surgeons, midwives or other persons who have been
esent at the delivery ; if the mother gave birth to the child at a place other than her
linary place of residence, the notification must be made by the person in wheos
use the birth took place."

Article 31. "The birth certificate must mention :

(1) The year, date, hour and place of birth ;
(2) The sex of the child and the names which are to be given to him
(3) The names, surnames, profession and domicile of the parents;
(4) The names, surnames, age, profession and domicile of the perso
making the notification and of the witnesses."

The case of children who die within three days of birth gives rise to difficultie
If the birth has been notified immediately, and if the child dies, for exampl after the second day, it is inscribed both in the register of births and in the regist of deaths.

If it dies before notification is made, it is only inscribed in the register of death Children *declared to be "not living" are not necessarily stillborn* children, as tha heading is sometimes made to cover children who have died *very young.*

Since January 1st, 1917, the certificates of children declared to be "not living are completed by a mention of the supposed age of the child and by a statement a to whether the child declared to be "not living" was born dead or alive ; in the latt case, the length of time that it lived must be mentionned.

In the case of a child declared to be "not living", the "certificate of death provided for by Article 5 of the Law of June 1st, 1865 (*Legal Gazette*, No. 60), mus be given.

This article reads as follows :

"Doctors shall sign, upon the death of any of their patients, a certificate death for the use of the registrar and shall at the same time indicate with the greates precision possible, but without breaking their oath or promise of professional secrecy what they believe to be the cause of death.

"They shall only issue the certificate mentioned in the preceding paragraph afte assuring themselves of the fact that death has actually occurred by personall examining the corpse."

In ordinary circumstances the doctor who certifies death is the doctor who ha attended the patient ; in certain cases the cause of death is notified by the docto whom the communal administration has entrusted with the duty of certifying death (Circular of the Ministry of the Interior dated May 27th, 1902, No. 3225, Departmen B.B., concerning the issue of certificates of death).

The forms employed for this purpose in the communes are *not standardised* b law.

Under Article 6 of the Law of April 10th, 1869 (*Legal Gazette*, No. 65) (as modifie in various details), relating to the measures to be taken regarding the burial of bodies cemeteries and inhumation fees, no interment may take place earlier than 36 hour or later than the fifth day after death (subject to the exceptions mentioned in deta in Article 6).

Article 6 reads :

"No interment may take place earlier than 36 hours or later than the fifth day fter death.

"The burgomaster may grant a dispensation in writing in respect of this regu- ıtion after taking medical opinion.

"If a doctor declares that it is necessary to hasten or delay the interment, the urgomaster may give written orders to the effect that the interment shall take lace before or after the date fixed in the first paragraph of the present article.

"The burgomasters and aldermen may give orders, in the interests of public ealth, that persons who have died of a specified disease shall, within a period of ss than 36 hours after death, be transported to the mortuary, if there is one in the istrict."

While it is prescribed that *every person who has died, and every stillborn child, ıall be interred*[1] (in a closed coffin and in a cemetery fulfilling the conditions laid down ı the law in question, etc.) — Article 1 of the law — *Article* 4 stipulates as follows :

"No interment may take place without the written permission of the registrar, .c...

"...In asking for permission, the applicant must produce the written certificate ferred to in Article 5 of the Law of June 1st, 1865 (*Legal Gazette*, No. 60). In the)sence of such certificate, steps shall be taken to ascertain that death has actually ken place and the certificate will be issued by a doctor appointed annually by the ırgomaster and aldermen and required to take an oath or make a promise in the esence of the burgomaster, the formula of which shall be determined by ourselves."

There is *no* law regarding the burial of a child prematurely born.

The registrar is, however, required to grant to a person who notifies the premature rth of a stillborn child the inhumation permission mentioned in this article nstruction of the Minister of the Interior, dated January 11th, 1873, G. 1113).

The data inscribed on birth and death certificates are collected in the Central atistical Bureau at The Hague.

Every *month* this Bureau publishes a "Table of marriages, births and deaths, talogued according to age and causes of death."

Every *year* the Bureau publishes "Statistics of deaths, catalogued according to e and causes of death".

The last statistics which have been published relate to the year 1921.

In 1917 a publication was issued entitled "Statistics of deaths which have curred among men of 18 to 65, classified according to professions and causes of ath, 1908-1911".

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[1] The authorities tacitly tolerate *cremation*. (The first cremation took place about 10 years o and the high court declared the persons responsible therefor to be "not guilty".)

Data regarding diseases which have occurred among the military, naval and colonial forces are also collected by the Central Bureau.

These data will not, however, be printed in future as has been the case until now.

Every month there will be published in the "Verslagen en Madedeelingen betreffende de Volksgezondheid" (Reports and Communications concerning Public Health) a return of persons who have died in the different communes of the diseases mentioned in Article 1 of the Law of December 4th, 1872 (*Legal Gazette*, No. 134).

The data on the basis of which this return is drawn up are supplied by the Central Statistical Bureau.

CENSUS.

The last census was taken in the Netherlands on December 31st, 1920.

Statistics.

In addition to an advisory body — the "Central statistical Commission" established by a Royal Decree dated October 6th, 1892, No. 233, — a Central Statistical Bureau was intituted by a Royal Decree dated January 9th, 1899, (*Legal Gazette*), No 43. The Commission remains the advisory body and keeps in touch with the Bureau and the latter can neither institute nor suspend statistical researches or publications without being authorised to do so in advance by the Central Commission.

The Commission may also give orders to the Bureau on its own authority and the Bureau must obey such orders, subject to an appeal to the Minister of the Interior. The Government cannot give direct orders to the Central Bureau; the orders are given by the Commission; in this way, the independence of the Central Bureau in its relations with the Government is safeguarded. The funds necessary for statistical work are provided for in the Budget of the Ministry of the Interior. The organisation of statistical work in the Netherlands is *not regulated by law.*

Centralisation has been effected in statistical matters by the establishment of a Central Bureau, as the statistics heretofore collected in the different departments are all transmitted to this Bureau.

Communal Statistical Bureaux.

By a decision of the Communal Council of July 4th, 1894, a Communal Statistical Bureau was established at Amsterdam.

In addition to the Bureau at Amsterdam, communal bureaux have been established at The Hague, Rotterdam and Utrecht.

A Statistical Commission is attached to the Health Council and this Commission ıas already issued several publications.

A Medical Statistical Bureau is attached to the medical and sanitary service of he Commune of Amsterdam and this Bureau has, since 1920, drawn up the statistics vith regard to the patients of the communal medical service.

HEALTH LEGISLATION.

International Regulations.

1. — *Opium Convention.*

The Law of June 20th, 1914 (*Legal Gazette*, No 257), containing the ratification f the Opium Convention concluded on January 23rd, 1912, at The Hague between he Netherlands and certain other States.

The Royal Decree of June 10th, 1920 (*Legal Gazette*, No 290), ordering the publica- on of the International Opium Convention in the *Legal Gazette* of January 23rd, 912.

. — *Measures taken in the Netherlands to prevent the Use of Opium and other similar Substances.*

In order to be in a position to carry out the International Opium Convention, ıe Netherlands Government promulgated a law containing measures on opium and milar substances mentioned in that Convention ; this law came into force in October)20.

There already existed a series of rules in the law on the exercise of the pharma- :utical profession designed to restrict the retail sale, viz. : in the case of opium, the .le of quantities below 50 grammes and in the case of chloro-hydrate morphine ıd cocaine, the sale of quantities below 10 grammes, to chemists and doctors who :ep pharmacies. The latter are required to enter in a register any quantity which ıey have supplied, unless it has been supplied upon a doctor's order. Veterinary ırgeons are subjected to similar regulations.

The new opium law makes it unlawful to prepare, transport, sell, supply, import ' export opium and its derivatives (raw, prepared or medicinal opium, morphine ıd heroin) or cocaine ; it also prohibits the stocking of these substances.

This prohibition does not apply :

(1) To chemists and doctors keeping pharmacies or to veterinary surgeons, bject to the stipulations already mentioned. The exercise of their profession is bjected to State supervision ;

(2) To persons who are authorised to engage in scientific study or research, t trade in narcotics or to prepare these drugs or the medicaments which contain them The second of the authorisations referred to is only granted to persons who can prov that they are engaged in the wholesale drug trade, that they do not sell the drugs ove the counter and do not keep a shop ; the third authorisation referred to is only gran ted to persons who can prove that they are engaged in the wholesale manufactur of pharmaceutical products.

Further, certain conditions must be fulfilled :

(*a*) The preparation of the narcotics and of the medicaments contain ing these substances must take place exclusively in buildings or premise suitable for the purpose ;

(*b*) The person concerned must keep a register in which he enters eac amount purchased, sold, supplied, exported, imported or prepared, togethe with the date ;

(*c*) Narcotics may only be supplied to persons authorised to obtai them ;

(*d*) Raw or imported opium and prepared opium intended for expor tation must pass exclusively throught the offices at Oldenzaal or Rosendaa or through the Ports of Amsterdam or Rotterdam ;

(*e*) The exportation of raw or prepared opium to countries which do no allow it to be imported is prohibited ;

(*f*) In order to export narcotics to countries where import restriction exist, the nature of the products despatched must be described in the docu ments accompanying the consignments, and the number and date of th export licence must be given.

(*g*) In order to export raw opium, each consignment containing mor than five kilogrammes must be marked "raw opium", and in order to expor prepared opium, each consignment must be marked "prepared opium" The marks on the wrappings must be placed on the same side as the addres and must be written in letters three centimetres high and in such a manne that they cannot be effaced by water.

* * *

The public health inspectors, and in particular those who are responsible fo supervising chemists, etc., and the Customs and police officials, both of the centra authorities and of the communes, are entrusted with the duty of supervising th execution of all these regulations. The Customs officials note the passage of ever consignment of narcotics which is exported, imported, or conveyed in transit an inform the public health inspectors accordingly.

As the law concerning opium, its derivatives and other similar products ha only been in force a short time, it is not possible to judge of its efficacy. Certai

missions have already been discovered and the question of amending the law is ow being considered ; the proposed modifications aim mainly at the absolute prohi- ition of the traffic in prepared opium and the possibility of adopting regulations hich will make the illegal possession of raw or prepared opium, morphine, cocaine nd their respective salts a punishable act.

. — *Convention between the Netherlands and Belgium regarding the Exercise of the Medical Profession in Communes on the Frontier.*

The Law of May 8th, 1869 (*Legal Gazette*, No. 80), ratifying various articles of the onvention concluded between the Netherlands and Belgium, according reciprocal uthorisation to doctors established in the frontier communes of either of the two ingdoms to exercise the medical profession or any of its branches in the frontier ommunes of the other.

The Legal Decree of June 18th, 1869 (*Legal Gazette*, No. 104), ordering the insertion the *Legal Gazette* of the Convention concluded at Brussels on December 7th, 1868, etween the Netherlands and Belgium, granting reciprocal authorisation to doctors the frontier communes of either of the two Kingdoms to exercise the medical rofession or any of its branches in the frontier communes of the other.

— *Convention between the Netherlands and Germany regarding the Exercise of the Medical Profession in Communes on the Frontier.*

The Law of April 16th, 1874 (*Legal Gazette*, No. 45), ratifying various articles of e Convention concluded between the Netherlands and the German Empire gran- ng reciprocal authorisation to doctors established in the frontier communes of either the two States to exercise the medical profession or any of its branches in the ontier communes of the other.

The Royal Decree of June 1st, 1876 (*Legal Gazette*, No. 71), ordering the insertion the *Legal Gazette* of the Convention concluded on December 11th, 1873, at Berlin tween the Netherlands and Germany, regarding the regulation of the exercise of e medical profession in frontier communes.

4. — *International Health Convention of Paris.*

The Law of February 21st, 1914 (*Legal Gazette*, No. 57), providing for adhesion the Convention concluded at Paris on January 17th, 1912, between the Netherlands, rmany, the United States of America, the Argentine, Austria-Hungary, Belgium, livia, Bulgaria, Chile, Colombia, Costa Rica, Cuba, Denmark, Ecuador, Spain, ance, Great Britain and Ireland, Greece, Guatemala, Haiti, Honduras, Italy, xemburg, Mexico, Montenegro, Norway, Panama, Persia, Portugal, Rumania, ssia, Salvador, Serbia, Siam, Sweden, Switzerland, Turkey, Egypt and Uruguay.

The Royal Decree of February 5th, 1921 (*Legal Gazette*, No. 52), ordering the publi cation in the *Legal Gazette* of the International Health Convention concluded at Pari on January 17th, 1912.

Organisation of Health Inspection.

The Law of November 27th, 1919, containing regulations with regard to healt inspection (the Law on the Protection of Public Health, 1919 (*Legal Gazette*, No. 784)

Article 2 of this law provides that a Health Council shall be established to advis the Government in regard to any measures it may take to promote public health If the Minister responsible for the execution of the law or the President of the Healt Council consider it necessary, advice is given by the Health Council sitting in plenar session. In other cases, advice is given by commissions appointed by the Presiden from among the members of the Council.

Article 3 entrusts with the duty of health inspection :

(*a*) the principal public health inspectors ;
(*b*) the public health inspectors and officials assisting them ;
(*c*) the Health Commissions.

Article 7. — "1. The burgomasters and aldermen shall send to the Inspector General, designated by a general administrative regulation, every month, or at th latter's request, when the number of deaths is abnormally high, every week, a retur of the deaths which have occurred in their communes, using for this purpose a form prescribed by the Minister responsible for the execution of the present law.

"2. They shall inform as soon as possible, and at any rate within 14 days, th Inspector designated by a general administrative regulation of the setting up i practice, the departure, death, and, if they are aware of it, cessation of practice, o any doctor, dentist, chemist or midwife in their commune."

In accordance with the provision of Article 8, Health Commissions shall b established for each commune which contains more than 18,000 inhabitants, or i the interests of which the Crown may consider such establishment desirable.

The establishment of a Health Commission may be ordered by the Crown in th case of several communes the joint population of which does not exceed 40,00 inhabitants.

Each Health Commission shall have the assistance of a secretary, and the latte shall receive a fixed salary, the amount of which is determined by the Permanen Commission of the Provincial States.

The expenses of the Health Commissions shall be borne by the commune o communes for whose benefit they are established. The cost of the salaries of th secretaries of the Health Commissions shall be borne by the State Treasury up t a maximum of 400 florins a year.

The decisions of the Communal Councils regarding matters of public health may nly be promulgated, supplemented, modified or repealed if the Health Commission stablished by the commune hasbe en consulted. The President, secretary and members f the Health Council, on the one hand, and the inspectors and officials, their assis- ants and the members and secretaries of the Health Commissions on the other, nall be entitled, the former throughout the Kingdom, and the latter within their spective districts, to enter all public buildings, schools and other premises employed r educational purposes, kindergärten, charitable institutions, orphanages, inns, dging-houses, night-shelters, vehicles and vessels, factories, workshops, warehouses, ops, prisons, hospitals and bathing establishments, to the extent necessary for the plication of the laws and decrees concerning public habitations, and to enter all aces of residence in order to obtain the fullest possible information regarding the ate and equipment of such buildings or places of residence.

Legislation against Infectious Diseases.

The Law of December 4th, 1872 (*Legal Gazette*, No. 134), laying down the measures be taken for the prevention of infectious diseases, as subsequently amended.

The infectious diseases to which this law is applicable are : —

(*a*) Asiatic cholera ;
(*b*) Typhus and typhoid fever ;
(*c*) Smallpox (variolae and varioloids) ;
(*d*) Scarlet fever ;
(*e*) Diphtheria ;
(*f*) Dysentery ;
(*g*) Plague.

This law may, by an internal administrative regulation, be declared to apply so to other diseases for a fixed period in certain communes, in certain parts of the ngdom, or throughout the Kingdom. The validity of such regulation shall expire e year after its promulgation, unless it has been confirmed during this period by w. For the time being the law in question is applicable, with the exception of Article , to epidemic cerebro-spinal meningitis, encephalitis lethargica and acute anterior liomyelitis. [1]

The burgomaster is authorised after consulting a doctor to cause persons suffer- g from an infectious disease and inhabiting a night-shelter, lodging-house, caravan barge, to be removed to a public institution or to other lodgings for treatment if, the opinion of the doctor, the patient can be safely transported.

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[1] Article 20 requires that a notice bearing the words "Infectious Disease", together with name of the disease, shall be posted up on the front of any house (or vessel) in which a person fering from an infectious disease is being treated.

The burgomaster is authorised to prescribe, and if necessary to cause to be exe cuted, the measures of disinfection mentioned in the preceding article in night-she ters, lodging-houses, caravans or barges ; he is also authorised, after consulting th inspector responsible under the public health law for supervising the application c legal stipulations concerning infectious diseases, to prescribe, and if necessary t cause to be executed, other measures designed to prevent the spread of disease. I the event of opposition to these measures, the night-shelter or lodging-house co cerned may be declared closed by the burgomaster for a fixed period. The burgomaste is authorised, after consulting the inspector or a doctor practising in the commun to cause to be cleaned and disinfected at the expense of the commune, in whole c in part, any houses, caravans, barracks or vessels which are, or which are likely t become, centres of infection.

The burgomaster is authorised to cause to be disinfected, at the expense of th commune, any infected objects or objects suspected of being infected, or, aft first seizing them, upon a written declaration by a doctor that seizure is necessar to cause them to be destroyed. The persons concerned may be required to bear share of the expense entailed.

The State grants a subsidy of 50 per cent to the communes, in cases mo specifically described, in respect of :

1. the cost of establishing or extending communal disinfection service
2. the expenditure incurred each financial year in respect of clea ing and disinfection operations ordered by the burgomaster ;
3. the expenditure incurred each financial year in training as disinfe tors persons designated for the purpose by the communal administration
4. the expenditure incurred each financial year in the rational (comp tent, specialised) administration of the disinfection service.

The subsidy of 50 per cent may also be granted to associations approved by th Minister as a contribution towards the cost of establishing and extending a disi fection service and towards the expenditure incurred each financial year in trainin as disinfectors persons designated for this purpose by the association concerned an in the rational administration of the disinfection service.

If infectious diseases break out or appear to be imminent, the burgomasters an aldermen may, at the expense of the commune, cause accumulations of rubbish t be removed, destroyed or disinfected and may take other measures in the interes of public hygiene.

In each commune in which the Permanent Commission of the Provincial Stat so decides, the communal administration is required to equip premises for the isol tion and treatment of persons suffering from infectious diseases. The Permane Commission also decides whether such installation is to be temporary or permanent.

Persons suffering from infectious diseases may not be transported or caused to e transported except in the cases provided for by law. Persons suffering from iseases of this kind are forbidden to travel. Objects which have been in contact ith persons suffering from or who have died of an infectious disease or which were the possession of such persons may not be transported, caused to be transported, iven or lent, or accepted or caused to be accepted, unless they have been disinfected.

It is forbidden to create for others, by carelessness or negligence, an avoidable isk of contagion.

Regulations regarding School Attendance.

The inhabitants of houses, caravans or vessels in which an infectious disease as broken out may not attend school until eight days after a doctor has certified in riting that the disease has disappeared from the houses or vessels concerned. The rohibition is withdrawn as soon as disinfection has been carried out under the rovisions of the law.

Any doctor who discovers a case of Asiatic cholera or plague must inform the urgomaster of the commune in which he has discovered the case within 24 hours. he burgomaster will forthwith forward a copy of this notification to the inspector.

Jenner Vaccination.

Teachers, both male and female, and pupils are only allowed to attend school they produce a written statement by a doctor certifying that they have undergone enner vaccination successfully, or more than once, or that they have had infantile mallpox.

Nevertheless, teachers, both male and female, and pupils who produce a certiate signed and dated by a doctor showing that they have undergone Jenner vaccintion once without results are allowed to attend school for a period of one year om the date of vaccination. These provisions apply both to kindergärten and to imary schools.

Notwithstanding these provisions, any teacher, whether male or female, or pupil ll be allowed to attend school if they produce a certificate dated and signed by two octors, showing, with reasons in support, that as a result of the Jenner vaccination special danger is to be feared for the health of the person in whose favour the certificate has been issued.

Such a certificate remains valid for three years after the date of issue. None of e above persons, however, will be allowed to attend school if the burgomaster blicly notifies the fact that there is an epidemic of smallpox in the commune.

In each commune the communal administration takes steps to give the inhabitants the opportunity at least once every three months of being *vaccinated or re-vaccinated free of charge.* Such opportunity is given at least once a month if the Minister of Labour has publicly notified the fact that there is an epidemic of smallpox in any part of the Kingdom and at least once a week if smallpox has broken out within the commune concerned.

Notification.

All heads of households, lessees (male or female) of night-shelters or lodging-houses and masters of vessels calling at ports situated within any commune and the heads of such charitable institutions as are referred to in the law concerning public assistance, and of prisons, reformatories, public penitentiaries, workhouses and lunatic asylums, shall inform the burgomaster, within 24 hours after discovery, of any case of infectious disease which has occurred on the premises in question.

The same regulation shall apply to the commanding officers of army corps or of warships stationed in any port, in respect of all barracks, vessels or other premises placed under their control (Article 19).

Article 20. — "Any houses, caravans or vessels in which a case of an infectious disease occurs shall be furnished immediately, or at latest within 24 hours after notification, through the intermediary of the burgomaster and at the cost of the commune, with a distinctive sign (placard), clearly visible from outside (and if necessary with more than one such sign), bearing the inscription "infectious disease", together with the name of the disease. The distinctive sign must remain there until it is certified by a doctor that the risk of contagion has disappeared."

Article 27. — "On the appearance of any infectious disease, the President, secretary and members of the Health Council and the members of the Health Commissions shall be entitled, the former throughout the Kingdom and the latter within their respective districts, to enter all dwellings."

Article 28. — "The burgomaster either alone or accompanied by persons whose assistance he may consider necessary and whom he has appointed for the purpose shall be entitled to enter the houses of the inhabitants, even against their will, between sunrise and sunset, in order to obtain the execution of the provisions of the present law or of the decrees issued in pursuance thereof."

Article 29. — "The provincial and communal administrations shall continue to be responsible for issuing regulations or ordinances designed to prevent, check or combat infectious diseases, in so far as such regulations and ordinances are not contrary to the provisions of the present law."

Vessels (*Article* 10).

Masters of vessels, which contain a person suffering from any of the diseases garded as infectious under the terms of Article 1 of this law, or in which ıy person has suffered from or died as a result of any of these diseases during the st 14 days, are required before or at the moment of entering a commune in which ıey intend to stay or to moor their vessel to inform the burgomaster of the above cts. They must anchor in the area assigned to them by the burgomaster and main there without entering into communication with the shore or with other ssels until disinfection has been carried out.

Smallpox.

Under the terms of Article 23 of the Decree of January 17th, 1923 (*Legal Gazette*, o. 18), laying down in detail the special measures to be taken to avert the risk of small- ıx or to prevent the spread and consequences of this disease, the doctor who examines ımigrants or other persons coming within the same category, at the frontier station at the first Netherlands frontier-post, is required, on discovering the existence of imminent danger to public health, immediately to inform the burgomaster and te health inspection official of the fact, without prejudice to the provisions of Article 1 of the Law of December 4th, 1872 (*Legal Gazette*, No. 134).

The Law of March 28th, 1877 (*Legal Gazette*, No. 35) (as amended on several ccasions), for preventing the bringing of infection into the country by vessels arriving m the high seas.

Any vessel which arrives by sea in a port or harbour of the Netherlands, or which achors there after having arrived by sea, is required, under certain conditions, to ndergo health inspection. This inspection is carried out by the inspector respon- le, under the Law for the Protection of Public Health, for supervising the appli- ion of the legal stipulations regarding infectious diseases, or by doctors under control appointed for this purpose by the Crown.

The cost of health inspection and of the measures taken in consequence of such ıpection are borne by the State.

The decree for the execution of this law was issued on January 3rd, 1923 (*Legal zette*, No. 34).

The Law of April 6th, 1884 (*Legal Gazette*, No. 80), laying down the special measures be taken for the prevention of certain infectious diseases and for combating the ead and consequences thereof (as completed and amended on several occasions).

Under Article 1 of this law, the Crown is authorised, when Asiatic cholera, gue, yellow fever, smallpox or typhus break out within or outside the country, to hibit by a general administrative decree, for a period not exceeding one year,

the importation, conveyance in transit or transport of rags, used garments, unwashe personal linen and bed-linen, raw wool, unworked bristle (horse-hair), skins, furs an other objects susceptible of carrying infection. Similarly, the State may take measure regarding the examination, isolation and disinfection of persons and goods, the trans port of persons and goods and public and private means of transport, without prejudic to the provisions of the Law of December 4th, 1872 (*Legal Gazette*, Nos. 35 and 36)

The State may prohibit or restrict :

(*a*) the entry into the country of persons coming from countries o districts where one of the above diseases has broken out ;

(*b*) the transit through the country or the circulation within the countr of persons coming from any country, district or locality, whether within o outside the Netherlands, in which one of the above-mentioned diseases ha broken out.

Legislation concerning Hygiene.

1. The Law of June 28th, 1881 (*Legal Gazette*, No. 97), containing legal stipula tions for regulating the retail trade in strong drinks and for suppressing publi drunkenness (the law on the liquor regime, as amended on several occasions).

By the Law of 1919 on the protection of public health, the "inspectors of alco holic liquor" became "public health inspectors for the campaign against alcoholism" Stress was thus laid on the social character of the work entrusted to these officials

2. Legal stipulations concerning *canine rabies* : these stipulations, which wer first imposed by the law on *canine rabies*, are now to be found in the law on cattle.

3. The law on foodstuffs : the Law of September 19th, 1919 (*Legal Gazette*, No. 581 regulating the inspection and designation of foodstuffs.

According to Article 1 of this law, the term "foodstuffs" applies to victual (except meat and alimentary products manufactured from meat — sausages — i so far as the inspection of them does not require a knowledge of chemistry) and liquo together with such articles of consumption as are employed in the preparatio manufacture, composition or preservation of victuals or liquor, and the article specified in a general administrative regulation, in so far as all these objects ar destined for trade or are put up for sale.

Article 2. — "1. For the purpose of foodstuff inspection the country is divided u into districts.

"2. Each district possesses an inspection service.

"3. The inspection services shall be established in the communes chosen by th State."

Article 6. — "The Communal Council of each commune shall draw up one or ore series of regulations regarding the inspection of goods."

The Minister of Labour addressed a circular on May 7th, 1920, to the Permanent ommissions of the Provincial States in which he drew their attention to an Ordinance ued by his Department. The text of the latter reads :

"*Article* 1. — The term 'foodstuffs' is intended in the present Ordinance to mean e products defined in Article 1 of the Foodstuff Law. The following acts shall assimilated to 'sale' :

(*a*) Keeping a stock for the purpose of sale ;
(*b*) Delivery ;
(*c*) Exposure for sale ;
(*d*) Transport ;
(*e*) Offer for sale or exchange ;
(*f*) Distribution ;
(*g*) Keeping foodstuffs at a market ;
(*h*) Keeping foodstuffs in a shop, place of residence, warehouse, factory, coach-house (stable, cattle-shed), vehicle or vessel, or on the premises of manufacturers, merchants, shopkeepers, dealers in, or hawkers of, articles of consumption..... except when such foodstuffs are intended for personal consumption.

"*Article* 2. — The sale of foodstuffs, the composition of which is faulty, or which e in an imperfect condition, is prohibited.

"*Article* 3. — The sale of foodstuffs, the consumption (use) of which is, or may be, rmful to life or health, is prohibited.

"People found guilty of infringing these regulations shall be liable to a term of prisonment not exceeding six months or (and) to a fine not exceeding 2000 florins, d to the confiscation of the foodstuffs.

"According to the Royal Decree of March 26th, 1921, the term 'foodstuffs' is ended to mean :

"1. All raw materials (including colouring substances and substances perceptible to smell and taste), together with preservatives which are intended to be used, or are in fact used, in the preparation of alimentary substances or foodstuffs or of liquor ;

"2. All articles intended to be employed or in fact employed in packing foodstuffs or liquor ;

"3. Tapestry made of paper or of some other material and used to cover furniture or to make curtains ;

"4. Toys ;

"5. Rubber articles employed in feeding infants ;

"6. Toilet articles and cosmetics ;

"7. Utensils used for the absorption of fluid or liquid food ;

"8. Articles used in washing, cleaning and shoe polishing ;

"9. Substances used for the destruction of insects (insecticides) o other vermin."

Under Article 16, the Crown reserves the right :

"I. To issue as often as necessary, in the interests of public health, a general admi nistrative regulation :

"(*a*) Designating the substances, objects or instruments the use o which is prohibited in the preparation, manufacture, or composition o foodstuffs specified in the regulation, or which may only be used subjec to the rules laid down in the present regulation ;

"(*b*) Setting forth the requirements which must be complied with i the preparation, packing, preservation, handling or transport of the food stuffs specified in the present regulation ;

"(*c*) Setting forth the requirements which the foodstuffs specified i the present regulation must fulfil.

"II. ..... to declare the provisions of any general administrative regulation t be not applicable, on conditions to be laid down, to goods intended for export.

"III. At the same time We reserve to Ourselves the right to authorise the Com munal Councils to issue instructions as to the requirements which a particular kin of foodstuff must satisfy....."

The first paragraph of this Article makes the determination of the requirement which a foodstuff must satisfy a question of *general* interest. The *local* authority i not, however, completely eliminated : there are, indeed, certain articles which ar susceptible of giving rise to local disputes. The third paragraph of the Article take this point into consideration.

The Royal Decree of May 17th, 1921 (*Legal Gazette*, No. 673), provides that i communes in which a regulation has been issued setting forth the requirement which *milk* and *bread* must fulfil, these stipulations may be enforced until a genera administrative regulation, issued by virtue of the first paragraph of Article 15 of th law, has specified the conditions which such foodstuffs must fulfil.

The Decree of 1922 *regarding Bread :* This Decree is based upon Articles 14 an 15 of the Foodstuff Law.

Article 14 provides :

"1. The State reserves the right to determine by a general administrative regu lation the designations to be employed in trade for the foodstuffs and other article which are destined for trade or which are put up for sale, viz. :

"(*a*) The designations which may applied, to the exclusion of a others, to foodstuffs or articles which are of the nature or compositio specified in the general regulation, or the preparations of which has take

place under the supervision established by a general administrative regulation;

"(*b*) The designations which may not be applied to foodstuffs or tarticles which are of the nature or composition specified in the general regulation, or the preparation of which has *not* taken place under the supervision established by a general administrative regulation;

"(*c*) The designations which must be applied to foodstuffs or articles which are of the nature or composition specified in the general regulation, or the preparation of which has *not* taken place under the supervision established by a general administrative regulation.

"2. Such general administrative regulation may lay down rules regarding the ıacing of these designations on the foodstuffs themselves, on the wrappings, or on ıe premises where the foodstuffs are exposed for sale.

"3. It may also be stipulated that foodstuffs and articles such as those referred ı in the first paragraph may only be designated with the State's consent, and on ınditions to be determined by the State, by a name which would not indicate, or ıich would indicate insufficiently, the nature and composition of the objects conrned.

"4. The designations relative to the nature or composition of foodstuffs or other ıticles can only be determined in the interests of commercial honesty; the designaıns relative to supervision or preparation can be determined alike in the interests of ıblic health and in the interests of commercial honesty.

"5. The State reserves the right to declare, on conditions to be specified, that the ıovisions of a general administrative regulation for determining designations are ıt applicable to goods intended for exportation.

"At the same time the State reserves the right to impose, in respect of infringeınts of such a general administrative regulation, in so far as it concerns other artis, a term of imprisonment not exceeding six months and a fine not exceeding 000 florins and, in addition, to order the confiscation of the articles which have ımed the subject of the infringement. These articles may be seized, and in the ent of condemnation, destroyed or rendered unsuitable for use by order of the judge, the general interest so requires."

The Decree of April 25th, 1922 (*Legal Gazette*, No. 221), in execution of Articles and 15 of the Law of 1919 on Foodstuffs (*Legal Gazette*, No. 581).

Article 7 of this decree, relating to *bread*, reads as follows:

Article 7. "I. The preparation, packing, preservation, handling and transport bread:

"(*a*) Must always be carried out in accordance with the rules of cleanliness;

"(*b*) Cannot be carried out by persons suffering from purulent wounds or ulcers, or cutaneous (dermatosis) diseases of the head, hands or arms, if such persons come into contact with the dough or the bread;

"(*c*) Cannot be carried out by persons who are carriers of typhus paratyphus, dysentery or plague germs.

"II. The preparation of bread must be carried out exclusively by persons whos head, hands and arms are clean.

"III. During transport on the public highway the bread must be effectivel protected against dust, dirt and insects."

Article 8. — "The preparation, packing or handling of bread may only tak place in premises which... etc., etc."

The Law of July 25th, 1919 (*Legal Gazette*, No. 524), containing prohibitions wit regard to meat and alimentary products manufactured with meat which might b harmful to public health (the Law of 1919 on the Inspection of Meat, No. 524).

The supervision designed to ensure the observation of this law is carried out b the public health inspectors.

The Law of September 19th, 1919 (*Legal Gazette*, No. 582), the object of which to make the necessary funds available for establishing conduit-pipes for drinkin water.

Domestic Hygiene.

The Law of June 22nd, 1901, containing legal stipulations regarding domest hygiene.

This law includes certain positive enactments, viz., stipulations guaranteein the drawing up of suitable regulations regarding new buildings.

Article 1 reads as follows :

"1. The Communal Council shall issue regulations regarding the requiremen which must be fulfilled :

"(*a*) *in connection with the construction of houses ;*

"(*b*) in connection with the total or partial renovation of houses ;

"(*c*) with regard to existing houses not included under (*b*).

"2. The Communal Council shall draw up regulations with regard to domest hygiene."

"*Article* 9. — In each commune one or more officials are entrusted with th supervision of the observance of the stipulations contained in Article 1, and all oth legal stipulations regarding domestic hygiene. These officials may carry out the duties in one or in several communes."

Article 11 regulates the granting of subsidies for the constructions of hous for the communes.

Article 12 contains rules regarding the obligation to take a census of house

Improvement of Housing and Over-Population.

"*Article* 14. — The Health Commission shall forward to the communal administration a statement with reasons in support indicating the houses :

"(*a*) which are uninhabitable in consequence of the non-observance of the stipulations contained in Article 1 of for any other reason. If the Commission is of opinion that the house can still be made habitable, it should append to its report a detailed description of the necessary improvements ;

"(*b*) which, although not uninhabitable, imperatively require certain duly specified improvements ;

"(*c*) which are occupied by a greater number of persons than is permissible under the local regulations."

"*Article* 15. — 1. If not less than three adult inhabitants of a commune submit to e communal administration a reasoned complaint regarding one or more houses hich, after personal examination, they consider to be uninhabitable, either in nsequence of the non-observance of the stipulations contained in Article 1 or for y other reason, or which imperatively require certain duly specified improvements, or hich are occupied by a greater number of persons than is permissible under the al regulations, the local administration shall immediately send such complaint to Health Commission and shall obtain the opinion of the latter.

"2. The same rule applies if the head of a household or a person living alone mits a similar complaint with regard to the house occupied by the complainant.

"3. The facts set out in the complaint are communicated by the communal ministration to the proprietor of the house or to the person who is competent to ry out the improvements demanded, and also to the occupant, viz., the head of household, if the complaint relates to houses occupied by a greater number of sons than is permissible under the local regulations.

"4. The Health Commission shall within one month inform the communal ministration by means of a reasoned opinion, and with due regard to the stipula- n contained in the preceding article, whether it regards the complaint as justi- d, in whole or in part, or as unjustified.

"5. A copy of this opinion shall immediately be forwarded by the burgomaster aldermen to the signatory of the complaint, or to the first signatory if there are re than one."

ification of the fact that houses are uninhabitable. The closing and pulling-down of such houses.

"*Article* 21. — 1. If a house is unfit for habitation, and if it cannot be rendered itable by means of improvements, it shall be declared to be uninhabitable by a sion of the Communal Council, after consultation with the Health Commission.

"2. The decision whereby a house is declared uninhabitable shall also contain an order to evacuate it within a fixed period, running from the day on which the right to appeal against the decision expires, or from the day on which the decision is confirmed. In the interests of domestic hygiene, it may be necessary to evacuate whole quarters or to pull down one or more houses or groups of houses ; it may also be desirable to obtain possession of land, whether built over or not, which is subject to a covenant not to erect buildings, in order to execute an extension scheme or a building scheme. In such cases it may be necessary to *expropriate* the land."

In order to prevent the construction of undesirable buildings, the Communal Council is authorised by Article 30 to prohibit the construction or reconstruction of buildings on land intended to be employed in the near future for the establishment of a street, canal or open space. As a preventive measure, the Council must, under Article 31, subject to a dispensation for a period not exceeding 10 years to be granted by the Permanent Commission of the Provincial States, draw up a plan for the extension of the commune in the case of all communes which contain more than ten thousand inhabitants or whose population has increased by more than one-fifth in the last five years.

The Permanent Commission of the Provincial States may require a commune other than those mentioned in Article 31, to draw up a plan of extension.

It goes without saying that the measures set out above often cannot be executed without financial assistance (for example, when an order is given to carry out improvements). Under the terms of Article 33, advances, productive of interest may be granted, by a decision of the Communal Council, to persons who have been ordered to carry out improvements. Such advances are only granted on the security of a mortgage placed on the buildings and estate in favour of which they are granted. They must be repaid within twenty years.

Associations whose work relates exclusively to domestic hygiene may obtain from the Communal Council advances, repayable in 75 years, either in regular instalments of equal amount or by means of annuities.

The commune may also grant to associations a right of ownership or a long lease in respect of communal lands or buildings (Article 35).

Under the terms of Article 36, funds may be made available by a decision of the Communal Council :

(*a*) for executing a plan of expropriation ;

(*b*) *for granting compensation in respect of the expenditure involved in the observation of the domestic hygiene regulations, including the cost of removal and of the transfer of the trade or industry exercised by the inhabitants of buildings which have been evacuated after being declared uninhabitable or of expropriated buildings.*

Advances may be granted to the communes by the State treasury. The payment of interest and amortisation must be effected by means of not more than 75 equal annuities. Grants may be made by the State treasury to associations, societies or

ndations, as compensation for the expenditure incurred by them in respect of mestic hygiene (Article 34).

Such associations, etc., must be engaged exclusively in the work of improving mestic hygiene and must be recognised as so engaged by the Crown.

Legislation concerning agricultural workers.

The Law of April 20th, 1918 (*Legal Gazette*, No. 259), designed to procure for agri- tural workers the full ownership of a plot of land and a house or to provide them h a "free" plot of land on lease.

Article 1. — "In accordance with the provisions of the present law, any agricul- al worker who fulfils the required conditions shall be entitled to obtain the full nership of a plot of land and a house or to obtain a "free" plot of land on lease. n agricultural worker within the meaning of the law is any person whose principal upation is paid agricultural labour). If an agricultural worker desires to acquire mall estate he must be possessed of sufficient funds to pay at least one-tenth of the penditure provided for in Article 4."

Article 4. — "The small estate [1] must be suitable for the purpose intended and st not cost more than 4,000 florins, including the preliminary improvements to be de in the existing buildings and in the land (in special cases the Crown may per- this maximum to be exceeded).

"The 'free' land must be situated in the proximity of the agricultural worker's se and must also be suitable for the purpose intended. The annual rent must not eed 50 florins nor be much higher proportionally than that of a larger area of land imilar quality and condition. In special cases the Crown may allow this maximum be exceeded.

"Advances productive of interest may be granted to the communes by the te Treasury.

"By a decision of the Communal Council, advances productive of interest may granted to associations or foundations.

"The agricultural worker pays interest at a moderate rate. As a guarantee the payment of his debt, he creates a first mortgage on his small estate.

"*Expropriation* may take place — without its being declared in advance by a law e necessary in the public interest — in the interests of agricultural workers who re to obtain the full ownership of a plot of land with a house or to obtain a plot 'ree' land on lease, except in the case of land or water belonging to a nursery garden, ards or *buildings, land or gardens attached to a nursery garden or orchard.*"

The Law of July 26th, 1918 (*Legal Gazette*, No. 492), containing regulations with rd to caravans and barges (the *Law on Caravans and Barges*).

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[1] The term "small estate" is understood to mean a plot of land and an agricultural worker's e united so as to form a whole: "free land" is land which does not form a whole with an ultural worker's house.

No caravan or barge may be inhabited unless a permit has been obtained fro the Queen's Commissioner by one of the occupants. A permit is only granted the caravan or barge is habitable and if the inhabitants possess sufficient means subsistence. The names of the persons who may reside in the caravan or barge a mentioned in the permit. The burgomasters of the places of temporary residence a authorised to strike out the names of certain persons and to add others if the hold of the permit so requests. The permit also mentions the maximum authorised nu ber of inhabitants. Each permit bears a number. In order to facilitate police enqu ries, the number must be affixed to the caravan or barge in such a manner as to clearly visible. Permits are granted for a period of three years, but they can in case expire before February 1st, 1925. They may be withdrawn in the interva The Communal Councils are authorised to designate *special* places in which caravar and barges must in certain cases remain. Caravans and barges *cannot be forbidde to stay in particular communes.* A temporary disposition allows inhabitants wh have avowable and sufficient means of subsistence, but whose caravan or barge unsatisfactorily equipped, to remain there during their lifetime. The system elimination by extinction is thus employed.

The law was put into force on October 15th, 1919, with the exception of Article 3

Article 31. — "All provincial and local regulations and the regulations of th polders administration shall be abrogated as from the date of the coming into force the present law. The Communal Councils continue to be competent to issue decre regarding the place which caravans and barges must occupy during their stay i each commune, and regarding the payment of a modest fee for remaining stationar on public land when the stay in any particular commune exceeds a certain perio to be fixed by regulation. This period must not be less than 14 days, whether co secutive or not, in the same civil year." The law was last amended by the Law May 11th, 1923 (*Legal Gazette*, No. 198).

The Law of June 17th, 1918 (*Legal Gazette*, No. 379), designed to relieve th scarcity of houses.

As it was essential, by reason of the extraordinary circumstances obtaining, t take measures to relieve the scarcity of houses, the following decree was promulgate

Article 1. — "We may declare that there is a scarcity of houses in any particul commune of so serious a character that it must immediately be relieved."

Article 4. — "The Communal Council, together with the burgomasters and th aldermen, are required to give their assistance, with a view to the execution of O Decree, either by carrying out on behalf of the commune the prescribed improvemen or, with Our consent, by enabling associations, societies or foundations, recognise by Us as engaged exclusively in the work of improving domestic hygiene, to effe the necessary improvements."

The Government therefore has power to compel indolent or recalcitrant perso to take steps to relieve the scarcity of houses. The Crown is now authorised

signate the communes which must take measures to counteract the housing scar-
y. The houses to be built will be of a *temporary* character. In view of the housing
arcity, the Crown may order, either in all communes or in certain specified communes,
at "to prevent or to continue to prevent a house from being used for the purpose
hich it served on June 1st, 1920, without the consent of the burgomaster and aldermen,
to pull it down without such consent, is prohibited. The burgomaster and alder men
ay make their consent dependent upon conditions calculated to relieve the housing
arcity" (Article 8). Unless prolonged, the housing right (or right to inhabit such
houses) (*droit d'habitation*) expires at the end of five years (Article 2).

Decree of July 25th, 1928 (*Legal Gazette, No.* 485).

Under the terms of this Royal Decree, the use of the houses may only be granted
families with children. No other person may inhabit them unless they are members
the household of the principal occupier. No trade or calling may be carried on in
m.

Care will be taken in letting the houses to see that persons of different sexes who
e reached or passed the age of 12 years and who are not married to each other
not compelled to pass the night in the same room. One sleeping-place may not
arranged on top of another or on the floor.

Supervision. The commune or collective organisation which has constructed
houses is required to appoint a person to supervise the observance of the regula-
ns regarding the letting, use and maintenance of the houses. No person may be
rusted with these duties in respect of more than 100 houses.

The following laws are still in force for the time being :

(*a*) The Law of March 26th, 1917 (*Legal, Gazette*, No. 257), designed to prevent the unreasonable raising of house rents (*The Law on Rent Charges*).

(*b*) The Law of March 25th, 1918 (*Legal Gazette*, No. 182), designed to prevent the expulsion of tenants (*The Law on Notices to Quit*).

(*c*) The Law of February 19th, 1921 (*Legal Gazette*, No. 70), laying down measures to prevent houses being left unoccupied. (*The Law concerning the Obligation to let Empty Houses*).

Description of Central and Local Public Health Organisations

The health service in the Netherlands is organised by localities (communes).
ghbouring communes appoint a special doctor for the schools or engage one of
doctors residing in the district to fulfil the duties of this office. Details concer-
certain of these services will be found below. At Amsterdam there is a communal
ical and sanitary service with a director and several senior officers. At The
ue there is a communal medical service and a school medical service, each

with its director. At Arnhem there is a school medical service, but no commun medical service. At Rotterdam and at Utrecht the two services are amalgamate There are no provincial services. The Government intends to lay before the Nation Assembly a bill regarding the health services as soon as circumstances permi It has been proposed to appoint school doctors in each district, but this propos has not so far been carried into effect.

There are no provincial disinfection services in Holland such as exist in Belgiu Provincial services now exist in certain provinces (Gelderland, Friesland, Groninge Northern Holland, Overyssel and Limburg), but they have been established l associations such as the "Green Cross" or the "White Cross"; there exist al certain communal disinfection services approved by ministerial decision. The associations maintain disinfection services approved by the Ministry and receive fixed subsidy on this account in the same way as the communes.

Under Article 5*b* of the Law of December 4th, 1872 (*Legal Gazette*, No. 134), t State "grants to the communes, in cases and under conditions to be determined l a general administrative regulation, a subsidy of 50 per cent in respect of :

"1. The cost of establishing or extending communal disinfection services ;

"2. The expenditure incurred each financial year in respect of the cleaning a disinfecting operations provided for in Articles 4 and 5, in so far as such expenditu is not borne by the persons concerned under the terms of Article 5*a* ;

"3. The expenditure incurred each financial year in training as disinfectors pe sons designated for the purpose by the communal administration ;

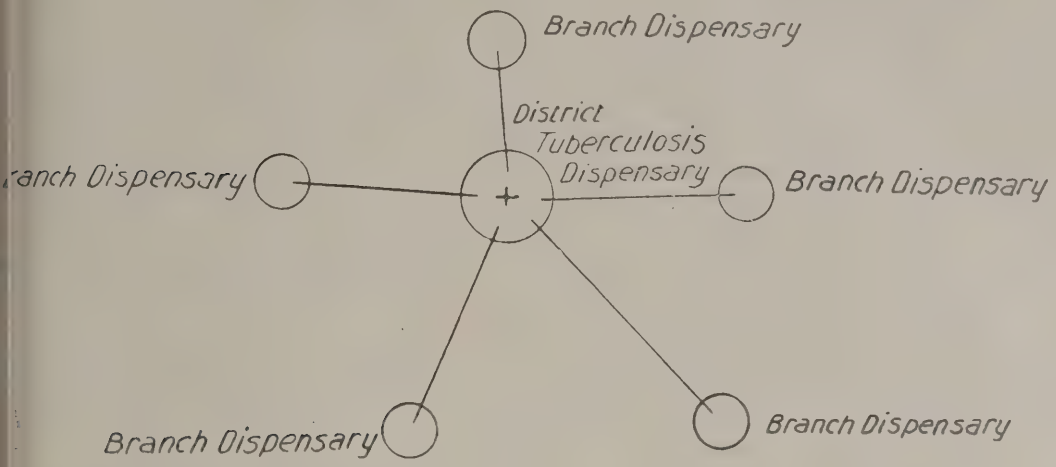
"4. The expenditure incurred each financial year in ensuring the rational adm nistration of the disinfection service."

Article 5. — "The State grants to associations who propose to effect the cleani or disinfecting operations referred to in Articles 4 and 5, in cases and under conditio to be determined by a general administrative regulation, a subsidy of 50 per ce in respect of the cost of establishing or extending disinfecting services, and in r spect of the expenditure incurred each financial year in training as disinfectors pe sons designated for the purpose by the association concerned, and in the ration administration of the disinfection service. The appointment of the persons attach to this service is effected as follows : possible candidates are invited by public adve tisement to apply for the vacant post and a choice is made from among those wl present themselves, or a further advertisement is published. The salaries are n everywhere the same ; certain communes pay higher salaries than others."

In certain provinces there exist *services for the campaign against tuberculos* organised by districts. At the centre of the organisation is a district consultati bureau (dispensary) with a tuberculosis specialist at the head of it. This doct has his office in the district bureau and also visits the eccentric consultation bureau

i ., the small bureaux situated on the periphery. Patients generally present themselves, t erefore, at one of the eccentric bureaux on the advice of the doctor who ordinarily a ends them. They only visit the central bureau of the district if the doctor c nsiders it necessary. Patients are, if necessary, placed under observation in a r rsing home attached to the service by contract.

Schema of a district (central) tuberculosis dispensary :



Travelling expenses may be repaid by the associations to poor patients out f the subsidies which the former receive from the State for the campaign against t erculosis. The salary of a district doctor is, as a rule, about 7,000 florins. He s only as a consulting physician.

The doctor in charge of the consultation bureau has under his orders one or more r nen district visitors, whose duty it is to supervise the association visitors who r engaged in the campaign against tuberculosis in the district concerned. The a ry of these district visitors varies between 2,000 and 3,000 florins. The doctor r. the district visitors are not State officials ; they are employed by the *Provincial . ociation for the Campaign against Tuberculosis* — a private association to which n local associations are attached. A list of the popular sanatoria is given below.

Name	Place	Year of Foundatio
Sophiastichting (Foundation Sophia).	Scheveningen (commune of The Hague)	188
Nederl. Sanatorium (Dutch Sanatorium).	Davos-Platz	189
Sanatorium voor Longlijders "Oranje-Nassau's Oord". (Sanatorium for tuberculous "Oranje-Nassau's Oord").	Renkum (commune of Wageningen)	190
Volkssanatorium (People's Sanatorium).	Hellendoorn (O.)	190
Amsterdamsche Sanatorium voor Borstlijders "Hoog Laren" (Amsterdam Sanatorium for tuberculous patients "Hoog Laren").	Laren (commune of Blaricum).	190
Sanatorium "Dennenhof"	Putten	190
St. Bernardus Gesticht. (St. Bernard's Home).	Bredevoort near Aalten.	190
St. Jacobus Gesticht. (St. Jacob's Home).	Eersel (N. Br.).	190
Rusthuis "Moria". (Resting House "Moria").	Nunspeet.	190
St. Oda Gesticht. (St. Oda's Home).	St. Oedenrode (N. Br.)	190
Christelijk Sanatorium "Sonnevanck". (Christian Sanatorium "Sonnevanck").	Harderwijk.	190

Name	Place	Year of Foundation
Zeehospitium. (Seaside Sanatorium).	Hatwijk aan Zee.	1908
Zeehospitium "Zonneveld". (easide Sanatorium "Zonneveld").	Oostkapelle.	1909
msterdamsch Kindersanatorium "Hoog-Blaricum". (Amsterdam Children anatorium "Hoog-Blaricum").	Laren (N. H.)	1912
inderhospitium "Clarastichting" ildren Sanatorium of the "Clara Foundation").	Zandvoort.	1913
ndersanatorium "Huis ter Drift". (Children Sanatorium "Huis ter Drift").	Doorn.	1913
oomsch Katholic Sanatorium "Dekkerswald". (Roman Catholic Sanatorium "Dekkerswald").	Groesbeek.	1913
Sanatorium "Beekbergen"	Beekbergen.	1916
Lighallen "Mariaoord". en-air Pavilions "Mariaoord").	Gennep.	1918
Sanatorium "Hilversum".	Hilversum.	1920
anatorium "Berg en Bosch".	Apeldoorn.	1920
anatorium van het H. Hart van Jezus. anatorium of the Sacré-Cœur).	Son (N. Br.)	1920
R. K. Limb. Groene Kruis Sanatorium n. Cath. Sanatorium of the Green Cross of Limburg).	Horn (L.)	1921

Name	Place	Year of Foundation
P. W. Janssen Ziekenhuis. (P. W. Janssen Hospital).	Almen (commune of Gorssel)	192
Sanatorium St. Joan de Deo "Huize Kalorama".	Beek near Nijmegen	192
Frisian People's Sanatorium	Appelscha.	192
Sanatorium "Lighallen"	The Hague	192
"Eerbeek" (voor typographen). ("Eerbeek" (for printers).	Beek.	192
Maria Auxiliatrix.	Venlo.	192

Wards for patients suffering from tuberculosis are attached to the hospitals Bemmel, Middelburg and Zevenaar.

The special ward for patients suffering from tuberculosis in the "Tesselschade hospital at Amsterdam may be regarded as a "tuberculosis hospital".

The State grants subsidies to the sanatoria, calculated according to the numb of days' treatment. (Approximately, 50 cents per day for treatment in the case adults and 25 cents per day in the case of children's sanatoria.)

SANATORIA FOR PATIENTS OF A CERTAIN CATEGORY (*for collective nursing*)

NAME	PLACE	Year of Foundation
Sanatorium "Dennenhof".	Putten	1900
Sanatorium "Dennenoord".	Doorn.	1901
Sanatorium "Renkum".	Renkum.	1904
St. Bernardus Gesticht (St. Bernard's Home).	Bredevoort near Aalten.	1904
St. Jacobus Gesticht (St. Jacob's Home).	Eersel (N. Br.)	1905
Sanatorium "Boschrust".	Renkum.	1905
Sanatorium "Middenbosch".	Doorn.	1908
St. Oda Gesticht. (St. Oda's Home).	St. Oedenrode (N. Br.)	1908
...K. Sanatorium "Dekkerswald". ...m. Cath. Sanatorium "Dekkerswald")	Groesbeek.	1913
...natorium van het H. Hart van Jezus. ...anatorium of the Sacré Cœur).	Son (N. Br.)	1920
Sanatorium St. Joan de Deo "Huize Kalorama".	Beek near Nijmegen	1921

For details as to the treatment given to the patients, see the report of the ...etherlands Charitable Association for the Assistance of the Poor", established at ...sterdam, V, on page 727 of the report of the Inspector-in-Chief (*Reports and ...munications*, No. 8, 1923).

[Distributed to the Council
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Geneva, October 17th, 1924.

LEAGUE OF NATIONS

HEALTH COMMITTEE

MINUTES OF THE THIRD SESSION

Held at Geneva from Monday, September 29th to Saturday, October 4th, 1924

LIST OF MEMBERS OF THE COMMITTEE

Dr. Th. MADSEN, *President,*	Director of the State Serum Institute, Copenhagen.
M. O. VELGHE, *Vice-President,*	Director-General of the Health Department at the Ministry of the Interior and of Health, Brussels.
Sir George BUCHANAN, C.B., M.D., *Vice-President,*	Senior Medical Officer of the Ministry of Health, London.
Surgeon-General H. S. CUMMING, *Vice-President,*	Director-General of the United States Public Health Service Washington.
Professor Léon BERNARD,	Professor of Hygiene at the Faculty of Medicine of the University of Paris.
Professor J. CANTACUZÉNE,	Professor at the University of Bucarest.
Dr. H. CARRIÈRE,	Director of the Federal Health Department, Berne.
Dr. Carlos CHAGAS,	Director of the Instituto Oswaldo Cruz, Rio de Janeiro.
Dr. W. CHODZKO,	Former Polish Minister of Health.
Dr. Alice HAMILTON,	Associate-Professor of Industrial Hygiene, Harvard Medical School, Boston.
Dr. N. M. J. JITTA,	President of the Health Council of the Netherlands, The Hague.
Professor Ricardo JORGE,	Director-General of Public Health, Lisbon.
Dr. M. TSURUMI,	Representative of the Japanese Public Health Service.
Dr. A. LUTRARIO,	Late Director-General of the Health Department at the Ministry of the Interior, Rome.
Dr. P. MIMBELA,	Professor at the Faculty of Medicine, Lima.
Dr. B. NOCHT,	Director of the Institute for Tropical Diseases, Hamburg.
Professor Donato OTTOLENGHI,	Professor of Hygiene at the Royal University, Bologna.
Professor Gustavo PITTALUGA,	Catedratico de la Facultad de Medicina, Madrid.
Dr. L. RAYNAUD,	Inspecteur général des Services d'hygiène d'Algérie, Algiers.
Dr. L. RAJCHMAN,	The Medical Director, acted as Secretary of the Committee.

Absent :

Dr. A. GRANVILLE,	Late President of the Conseil Sanitaire, maritime et quarantenaire, Alexandria.

She pointed out how important it would be for them when in England to note the excellent arrangements for the health of the workers that had been made in Staffordshire in the pottery industry, which otherwise was so injurious.

Sir George BUCHANAN presumed that the participants in this interchange would not be concerned merely with visiting prosperous industries that were in a position to make great improvements in the living conditions of their workpeople, but would also visit less prosperous industries which could not do so much as the others for their workmen. They would, in all cases, have to study the official requirements applicable to all industries and the way in which they were enforced. The matter would require a considerable amount of preliminary consideration if England were to be visited. In England, the requirements affecting the workers came under several distinct organisations. He asked what type of person should be chosen for this interchange of specialists? Was it the factory medical officer, or the factory welfare officer, or the officers of the central departments of the Government, or local medical officers of health?

Dr. RAJCHMAN reminded the Committee that the choice of specialists was clearly defined in the following words in M. Albert Thomas' letter to the Committee :

> "Groups of doctors, inspectors of factories and of labour officials belonging to a central or provincial labour inspection office, who are specialists in industrial health and pathology." (Health Committee, Minutes of the First Session, page 27.)

Sir George BUCHANAN noted this definite statement and added that it would also be advisable to determine the number of representatives which any particular country could send.

M. VELGHE stated that for Belgium the question was rendered all the easier by the clearly defined powers and duties of the various experts :

(1) Health experts proper;

(2) Factory inspectors, divided into two categories : (*a*) engineering experts; (*b*) medical experts.

Sir George Buchanan's remarks and the precise definitions given in M. Albert Thomas, letter would enable those administrations in which the powers and duties of factory inspection were not so clearly defined to appoint the best-qualified people.

He agreed with his British colleague that it was not advisable to show only the best side of what was done for the workers in each country. It was necessary to draw attention to the unsatisfactory side of the question, in this field as in others, and to state the steps which had been taken to improve the situation.

He finally pointed out how useful it would be for those taking part in the interchanges to obtain, in Western countries which were compelled to recruit their labour largely from abroad, an idea of the living conditions (often inadequate) of foreign workmen (lodging, water, food, etc.).

Dr. JITTA stated that the visitors would find the sanitary conditions in the Netherlands, especially in the industrial and mining centres, very satisfactory. However, in that country as elsewhere, there were some things which were not above criticism, and industries carried on at home, especially, fell very far short of the ideal from the health point of view. He would recommend Dr. Carozzi, when preparing for the interchange, to apply directly to the Director-General of Labour or to him, since the interchange would deal with the protection of labour in general.

In reply to a question by the PRESIDENT, Dr. RAJCHMAN gave explanations regarding the Advisory Committee on Child Welfare, mentioned in his report. The fifth Assembly had just voted a resolution authorising the formation of this Committee of the League, which would assume the functions that were previously exercised by the International Association for the Protection of Child Welfare, at Brussels, the latter having to confine itself henceforth to centralising the activities of private associations. This new work would be connected with the Social Section of the Secretariat of the League, since it was specially concerned with legal questions of protection (international legislation, etc.), but it was understood that, should any health questions arise, the Health Organisation would be consulted. He read paragraphs 1 to 5 of the proposal on this question submitted by the Fifth Committee to the Assembly (Annex 29).

In reply to a question by Professor Léon BERNARD, Dr. RAJCHMAN explained that the details for the interchange of specialists for the protection of child welfare had not yet been determined, mainly for budgetary reasons. He hoped to submit to the Committee a detailed plan at the next session.

Dr. MIMBELA proposed that the Committee should express its gratitude to the Government of the Kingdom of the Serbs, Croats and Slovenes for its generous action in undertaking to pay the travelling expenses and subsistence allowances of all the participants in the interchange to take place in that country. He hoped that this example would be followed by other Governments.

The Committee accepted this proposal.

SECOND MEETING

Held on Monday, September 29th, 1924, at 3.30 p.m.

Present : All the members of the Committee with the exception of Surgeon-General Cumming and Dr. Granville.

91. Report of the Medical Director : Discussion on Chapter IV—Interchange of Health Personnel (*continuation of the discussion*).

Dr. CHODZKO made a few remarks in regard to the following two points : the programme of interchanges and the composition of the groups taking part therein.

In their expositions, he said, the lecturers were inclined to lay stress on certain aspects of health problems which interested them most, either from the personal point of view or from the national or even local point of view, and to neglect the more general aspects of the problem, which would, however, be of greater interest to foreign visitors. Those present, not being in possession of the legislative or administrative texts, were not able to discuss any question with full knowledge of the matter, either at the introductory lectures or at the final lectures.

The lecturers, moreover, generally confined themselves to repeating what was to be found in the printed reports distributed, and the lectures, therefore, lacked the stimulus of novelty. The speaker proposed that a full report concerning questions of social hygiene, legislation, health institutions and the political, social and health organisation of one particular country, together with the necessary statistics, should be compiled by the persons best qualified to do so, namely, the heads of the public health services; the specialists lecturing would then simply make a brief commentary on the texts distributed, so as to leave more time for discussion. Before the interchange took place, each of the participants would receive this general report and as complete a collection as possible of the necessary official texts.

He pointed out the disadvantage of drawing up very strenuous programmes of work which were likely to put too great a strain on the officials taking part in the interchanges. It would be enough to confine the visits to one single typical institution of each kind; for example, a big general hospital, a small urban hospital, a rural district hospital, a small country hospital (if any), an isolation hospital, a lunatic asylum, etc. The same would apply in the case of institutions for children or old people, in the case of dispensaries and arrangements for drinking water, etc. There was no need to visit old or badly organised institutions, which were interesting merely as historical curiosities.

It would be a good thing to take advantage of the unique opportunity offered by this system of interchanges to enable the representatives from the various countries to acquire knowledge regarding health conditions in each other's countries. Each of them, before leaving, might prepare a condensed report, accompanied by statistics, on his own country; while the interchange was in progress, two afternoons a week might be devoted to these smaller lectures.

As regards the composition of the groups participating in the interchanges, it would be desirable that they should include both State health officials working in the central health administration and health officials whose work lay in the rural districts, where health conditions were less favourable than in the big towns. Some countries were inclined, under this system of interchanges, to appoint mainly municipal officers of health. It would be better either to admit fewer of these officials to the interchanges or else to form separate groups of these officials, that is to say, to put them, in their capacity as municipal officers of health, in the same group as health officers who were specialists in urban districts.

The speaker further urged the advantage of securing the participation of professors of hygiene, since this would tend to give to the teaching of hygiene, which had hitherto frequently been too theoretical, a more practical character and would raise the level of the discussions and of the lectures held during the interchanges.

Professor Léon BERNARD said that the character of the teaching of hygiene depended very largely on the special interests of the professors; a bacteriologist tended, in his teaching, to lay stress on the bacteriological side and a physician on the side of social hygiene. The latter was the prevailing tendency in France.

It would not be possible to make any hard-and-fast rule for the proportion of municipal doctors and State medical officers taking part in interchanges; it would vary according to the country. But in the absence of strict rules, the principles laid down by Dr. Chodzko were excellent.

Dr. JITTA pointed out that in certain cases, and more especially in that of tuberculosis, some of the health officials taking part did not appear to be particularly well qualified. Moreover, the length of time involved by the interchanges prevented the various health administrations from parting with their best specialists, whose presence would be of the greatest value to the

interchanges. He also agreed with Dr. Chodzko's remarks in regard to the overworking of the officials taking part in the interchanges. Lastly, he urged that the latter should be told clearly what was expected of them.

Dr. CARRIÈRE, in view of the observations he had made during the interchange which had just taken place in Switzerland, wished entirely to support the remarks made by Dr. Chodzko.

He believed that it would be useful to arrange, for the interchanges, groups which would be somewhat homogeneous, it being understood, of course, that it would not be possible to follow a too rigid scheme and that it was necessary to take into consideration the special characteristics of the countries taking part in the interchange and of the country in which it would take place. He had noticed that too wide differences in the origin, constitution and duties of the groups taking part in the interchanges had an unfortunate effect upon the progress of the interchange.

He wished also to emphasise the question of language. While not insisting that all the members taking part in an interchange should know perfectly the language or languages of the countries they visited, it was necessary for them to be sufficiently familiar with the language to enable them to follow the lectures without it being necessary always to have an interpreter.

As regards the length of time of the interchange, Dr. Carrière thought, judging from his past experience, that six weeks was not too long if the members were to become familiar with the health organisation of a country, particularly if the organisation was as complicated as that, for example, of Switzerland.

The interchange which had just been completed in Switzerland had served as useful experience for him. He had had to examine the institutions which had been set up in his country and had discovered things which he might not have discovered without the interchange. In any case, it was certain that if a new interchange took place in Switzerland he would profit by his own recent observations and by the criticisms made, with a friendliness which he much appreciated, by the members of the interchange during the final discussions.

The PRESIDENT expressed his agreement with Dr. Carrière's remarks. He thought it would be advisable to reduce somewhat the length of the interchanges. The visit paid to Denmark had impressed him as being of value not only to those actually engaged in the work but to a large number of Danish doctors, many of whom had asked him if other interchanges could be arranged there. The interchanges had increased the prestige of the League in the eyes of his compatriots. On behalf of his colleagues, he congratulated the Medical Director and the Health Organisation on the preparatory work done in connection with the interchanges.

Dr. LUTRARIO agreed that, in principle, it was desirable that the groups participating in the interchanges should be more homogeneous in character, but was of opinion that, in practice, this presented difficulties which must be taken into account.

Professor JORGE asked if it would not be possible to adopt a fresh system, that of individual courses of study.

Sir George BUCHANAN expressed his satisfaction that the British health officials who had gone to Denmark, Switzerland and the Netherlands under this system had all declared that it had been of great benefit to them. He was glad that the efforts made to carry out the system in England had been so much appreciated. As regards the passage in the Medical Director's report referring to the discussions on the credits for the interchanges, he said that the Health Committee must not misunderstand the British delegation's action in the Fourth Committee of the Assembly. The British delegation was in no way opposed to the interchanges, which had met with full approval in Great Britain; it had merely thought that, in principle, the major proportion of the necessary funds for such a purpose as this ought not to be furnished by the League, which had refused credits to refugees, intellectual co-operation, etc.

In connection with the interchange in England at the beginning of this year, he had received from the British Society of Medical Officers of Health a communication directing attention to the following two points :

(1) It would be expedient to shorten the period of the interchanges,—say, by one week;

(2) It would likewise be expedient to reduce the number of special interchanges. He noted at least five groups of visitors for special courses, all of whom apparently would wish to go to Great Britain.

The British health officials would welcome to the best of their ability experts of whose visits they had been previously informed, but, for convenience' sake, it would be advisable to allow some interval to elapse between the interchanges.

The Society pointed out that it would be advantageous for health officials, when visiting England on a subsequent occasion, to study the health organisation of London, which presented certain features of special interest.

He begged Dr. Carozzi to consult him beforehand in regard to visits to factories. As regards the selection of candidates for the general interchange, it would be wise to take into account the various suggestions made concerning the necessary qualifications, without, however, laying down hard-and-fast rules, as these visits were of advantage to all kinds of experts.

It did not seem advisable, so far as his country was concerned, to draw up a list of possible candidates in advance, as such a list would contain too many names in view of the small number of appointments to be made. It would meet the case if, when the time came, each country forwarded a list of the representatives who were proposed.

As regards the interchange in the Far East, he asked what method would be adopted and if this interchange would include members of the Health Committee, Secretariat officials, etc.

Dr. NOCHT suggested that an interchange might, with advantage, be organised among health officials of the principal ports in the world to discuss questions of quarantine; health protection on board ship, etc., not from the scientific but from the practical point of view; the inspection of vessels, disinfection, etc.

Dr. TSURUMI expressed his pleasure that there was to be an interchange in the Far East, where the campaign against epidemics raised such serious questions. He hoped that members of the Committee would take part in it; they would thus be able to see conditions not only in Japan but in the Far East in general.

Dr. RAJCHMAN wished to reply to the remarks made by members of the Committee. He agreed with Dr. Chodzko as to the advisability of preparing and distributing the official texts and lectures in advance. On the other hand, he thought it would be difficult to restrict the programme of the visits if they were to produce the desired results. He thought, too, that it might be inadvisable to ask those taking part in the interchanges to prepare reports on their own countries, as they were commissioned by their health administrations to study the practice of public health and not to act as representatives of their countries. As regards the homogeneity of the groups, the different countries should be allowed, as Sir George Buchanan had said, full latitude in the selection of those whom they desired to send, it being understood that the Health Organisation of the League had the final word. The members of the Committee should arrange with their health administrations that the candidates selected should be those most likely to derive benefit from their visits. As regards the participation of professors of hygiene, he would like to know how the latter would be designated, whether by the Ministries or by the public health administrations, etc.

In reply to Dr. Jitta's remarks, he agreed that the choice of certain representatives had perhaps not always been a very judicious one and he directed Sir George Buchanan's attention to the value of the lists supplied in advance by the different countries—of which he had already received a number. Various attempts had already been made to deal with the question of individual courses of study, but financial considerations had made it impossible to go on with them.

He hoped that the organisers of the British interchange would not insist upon any great reduction in the length of the interchanges; he would see that next year the organisers should not be overworked; he pointed out that it was the British Society of Medical Officers of Health itself which had asked that the recent visits should follow one after another; the special visit to the London organisation which had been decided upon in principle last year would be carried out during one of the next interchanges.

It was desirable that members of the Health Committee should take part in the Far East interchange; but it would be more difficult to arrange for the presence of Secretariat officials, which would raise a budgetary question.

Dr. Nocht's suggestion was an important one, and the principal steamship lines would, no doubt, grant travelling facilities to the health officials of ports participating in such interchanges; the programme might be drawn up in consultation with members of the Committee who were interested in questions of health conventions, maritime ports, etc., and discussed at the next session.

In reply to an observation made by Dr. LUTRARIO, Dr. RAJCHMAN explained that financial considerations alone had prevented the organisation of special visits of engineers, which would be of great value. The negotiations now being carried on with the Rockefeller Foundation might make it possible to submit proposals concerning this matter in April 1925.

In reply to an observation made by Professor Ricardo JORGE, Dr. RAJCHMAN explained that the Committee had considered the question of individual missions, but these could only be carried out to the extent to which funds were available.

92. Report of the Medical Director: Discussion of Chapter V—Epidemiological Intelligence Service.

The chapter dealing with this question in the Medical Director's report was read (Annex 28).

Sir George BUCHANAN referred to the detailed consideration given by the Committee last year to the contents of the Annual Report on Epidemiological Intelligence for 1923.

He was glad to note the attention which had been paid to the suggestions made in the volume for 1924, which represented a considerable advance on which the Intelligence Service ought to be congratulated.

He hoped special attention would be given to the series of medical statistical handbooks which were being prepared for certain countries. In his view, they would constitute a series of the greatest practical value for international comparisons. He also asked for an explanation regarding the conferences referred to on page 7 of the printed report (Document A. 22. 1924) and the propositions in Dr. Eichel's report (Annex 28 *a*) on notification of infectious diseases.

Dr. RAJCHMAN made the following observations :

1. He hoped that the Committee during its present session would be able to study at least one of the volumes of demographic statistics.

2. The interchange that had already been made between statisticians responsible for the registration of notifiable diseases in certain European countries had been a preliminary experiment and had furnished very useful information for the Epidemiological Intelligence Service; the limitation of the next interchange of statisticians to medical statisticians was in accordance with a decision taken by the Committee at its first session.

3. The question of setting up a "World's notifiable diseases Registration Area" raised a very big problem, the consideration of which could be resumed in April, when the Committee would have the full facts of the case before it.

93. Report of the Medical Director : Discussion of Chapter VI—The Work of Serological and Biological Standardisation.

Dr. RAJCHMAN read the passage in his report dealing with this question.

The PRESIDENT described the results obtained by the Conference on the standardisation of anti-dysenteric serum which had been held at Geneva on September 26th and 27th, 1924. That Conference had made it possible to overcome the difficulties that still stood in the way of the establishment of a standard serum by getting rid of the differences that had remained after the meetings at London in 1921 and Paris in 1922 regarding the method of injection to be employed and as to whether standardisation should be based on the anti-toxic potency of the serum or on its disinfectant properties. He read the draft resolutions drawn up by Drs. Cantacuzène, Dopter, Dumas, Doerr and Kolle, which appeared to show that there was now nothing to prevent the adoption of a standard international serum.

Sir George BUCHANAN was pleased to note that, in future, laboratories could obtain on request standard sera for diphtheria, dysentery and tetanus. He hoped that, later on, the Copenhagen laboratory would report on the use made of these facilities for standardisation.

94. International Conference for the Unification of Potent Drugs : Letter from the Belgian Ministry for Foreign Affairs.

A letter from the Belgian Ministry for Foreign Affairs dated August 6th, 1924 (Annex 30), was read, together with the programme of the questions to be submitted to the Conference in question. The Secretariat of the League was invited to be represented at the Conference.

The PRESIDENT thought that the Committee could not ignore this Conference, which would deal with questions in which the Committee was specially interested. The Bureau of the Committee might be instructed to appoint competent persons to carry out preparatory work calculated to assist the work of the Conference in certain directions.

Sir George BUCHANAN thought that the Committee should know the replies given by the British Government on two items of the programme :

Revision of the Decisions adopted by the first Conference.

In regard to biological tests, the British Government did not think that any addition should be made to the tests required in the Pharmacopœia, beyond those established as a result of the work of the League Health Committee.

Consideration of a Scheme for the Creation of a Permanent International Pharmacopœia Secretariat.

The British Government thought that the affiliation of such a Secretariat to the League should be considered.

It would be advisable for the Medical Director, or whoever represented the Health Organisation at Brussels, to acquaint the Conference with the special work done by the Health Committee, but he saw no need for any preliminary work.

M. VELGHE reminded the Committee of the circumstances in which the Belgian Government had thought fit to continue the work of the first Conference held in 1908, and its reasons for considering it an opportune moment for supplementing the occasional work of this Conference by setting up a permanent Secretariat. It might be highly desirable for the Health Committee to assist in the establishment of a new international organisation and particularly to take part in the work of the Conference as regards the questions with which the Health Committee was already dealing.

Dr. RAJCHMAN thought that the question might be summed up as follows :

1. The Health Section of the Secretariat would prepare a memorandum on the special work of the Health Committee, and would be represented at the Brussels Conference.

2. The question of the creation of a Permanent International Pharmacopœia Secretariat should be considered.

3. A qualified expert should be instructed to prepare for the April session of the Health Committee a preliminary enquiry into the possibility of unifying certain pharmaceutical methods.

Sir George BUCHANAN was afraid that the Health Committee might be undertaking too much if, after its work on the unification of biological products, it now asked an expert to enquire into the possibility of unifying drugs. The Committee should first of all see what could be expected of the coming Conference.

The PRESIDENT reminded the Committee of the value of discussions that took place at small meetings of competent persons, as seen from the results obtained in connection with sera. In order to avoid the risk of the Conference meeting without having the opinion of qualified

persons, it would be advisable first to make preliminary enquiries into the possibility of reaching an agreement. He had been persistently told that no satisfactory result could be reached without the intervention of the League.

Professor Léon BERNARD thought that the Bureau of the Committee should be left to study the question in conjunction with the Medical Director.

This proposal was adopted.

95. Report of the Medical Director: Discussion of Chapter VII—Report of the Committee of Experts on Tropical Diseases.

Dr. RAJCHMAN read the passage in his report dealing with this question.

After Professor Léon BERNARD had made some observations, the PRESIDENT proposed, *and the Committee approved,* the formation of a Sub-Commission to be composed as follows :

Dr. CHAGAS (Chairman), M. VELGHE, Dr. NOCHT, Sir George BUCHANAN, Professor PITTALUGA, Dr. RAYNAUD, Professor JORGE.

96. Report of the Medical Director: Discussion of Chapter VIII—Requests to the Health Committee for Technical Advice.

Dr. RAJCHMAN read the passage in his report dealing with this question. He added that Dr. Gilmour, when in Persia, had made a very interesting report, and the Persian delegation to the Assembly would like to know the outcome of his journey. It would be well to ask Dr. Gilmour to make a statement to the Committee. The reports of Dr. Haigh and Dr. Norman White, and the work of the Sub-Committee appointed by the Malaria Commission, would be dealt with later by Dr. Lutrario.

97. Report of the Medical Director: Chapter IX—Commissions and Sub-Commissions of the Health Committee.

Dr. RAJCHMAN read the passage in his report summarising the work done.

98. Report of the Medical Director : Discussion of Chapter X—Proposals for New Investigations.

In regard to tuberculosis, Dr. RAJCHMAN drew the Committee's attention to Professor Léon Bernard's letter to the Secretary-General on behalf of the International Union for Combating Tuberculosis (Annex 31). In accordance with a suggestion made by Sir George BUCHANAN, *it was agreed to discuss the question at a plenary meeting before referring it to a Sub-Commission.*

The PRESIDENT, on behalf of the Committee, congratulated Dr. Rajchman on his lucid and detailed report.

99. Report of the Commission on Instruction in Public Health.

Professor Léon BERNARD read his report (Annex 32). He pointed out that, after No. 16 of the "list of questions forming the bases of the enquiry", it would be advisable to add the question of the *date of the creation of the various educational departments.*

At Professor JORGE's request, the discussion of this report was adjourned until Wednesday, October 1st.

THIRD MEETING

Held on Tuesday, September 30th, 1924, at 10 a.m.

Present : All the members of the Committee with the exception of Surgeon-General Cumming and Dr. Granville.

100. Scheme for the Study of the Early Diagnosis and Treatment of Tuberculosis : Proposal by Dr. Tsurumi.

Dr. TSURUMI read his proposal (Annex 33).

He recalled the resolution voted in the preceding month by the International Union for the Prevention of Tuberculosis, on the occasion of its Lausanne Conference, inviting the Health Committee to devote special attention to the study of the prophylaxis of tuberculosis. Moreover,

the fifth Assembly had just approved a proposal of the same character submitted by the Government of the Kingdom of the Serbs, Croats and Slovenes. These manifestations showed that the moment had come for the Committee to take up a question which was of paramount importance from the point of view of international hygiene.

Professor Léon BERNARD supported Dr. Tsurumi's proposal. It would be inexplicable if the Health Committee of the League were to neglect the problem of tuberculosis. It would, however, be necessary to determine the scope of the investigations to be undertaken and the methods to be employed.

The text of Dr. Tsurumi's proposal sufficiently indicated the complexity and diversity of the problems. The study of the preparation, toxicity and titration of tuberculins came within the sphere of the Commission on Sera, whereas the study of reactions was a clinical matter which called for the assistance of phthisiological experts. Comparative study of methods of early treatment opened up an equally vast and important subject. Finally, an enquiry into the value of social measures could not be based solely on statistics which lent themselves to various interpretations; it also called for the assistance of competent phthisiological experts.

He reminded the Committee of the important report which had been submitted by Sir Robert Philip at Lausanne, relating in particular to Great Britain. Similar enquiries ought also to be conducted in regard to other countries. Moreover, Professor Léon Bernard showed by the example of the United States and Denmark how the question of the value of social measures of prevention could still give rise to discussion. All those problems called for powerful intervention, namely, that of the League of Nations.

It would, no doubt, be expedient to appoint a Commission which would carry out a preliminary investigation of the question, arrange the division of the work and determine the methods to be followed—a Commission composed of members of the Health Committee who were qualified by laboratory experience, administrative capacity and phthisiological work. The Commission would then appoint a qualified person to carry out an enquiry on the lines indicated, and when that had been done it would express its opinion on the problem.

The PRESIDENT asked that a letter from the Government of the Kingdom of the Serbs, Croats and Slovenes might be read (Appendix to the Medical Director's Report, Annex 28), and opened a general discussion on Dr. Tsurumi's proposal.

Professor OTTOLENGHI expressed his sympathy with the valuable proposal put forward by Dr. Tsurumi and rapidly reviewed some of the principal points for study which were raised by the proposal and which he recommended to the attention of the Committee : the importance of diagnosis, which was the basis of all prophylaxis and treatment; the determination of the value of the various tuberculins and of the state of tuberculous infections, latent or threatening; the innocuous character of the various methods; the inspection of school-children for tuberculosis with a view to a more effective prophylaxis; cutaneous reaction and the attempt to standardise serodiagnosis; the question of immunity from tuberculosis; tuberculosis in the colonies, especially in Africa, etc.

Sir George BUCHANAN said that it seemed that the Committee had to deal with three proposals :

1. Standardisation of tuberculin (Dr. Tsurumi's proposal).

2. Study of the problem of the prophylaxis of tuberculosis (proposal of the International Union, submitted by Professor Léon Bernard).

3. Reply to be given to the Government of the Serb-Croat-Slovene Kingdom regarding "the most effective modern methods for combating tuberculosis", and the request that the Committee should endeavour to establish an "international doctrine" in regard to the fight against tuberculosis.

The first investigation appeared simple, in principle, and there were precedents for it. British experts and the Medical Research Council would be happy to take part in these enquiries, which ought to be facilitated by the recent researches of Dr. Dryer and others in regard to methods of precipitation. None of this work would involve heavy charges on the budget.

The enquiry regarding prophylaxis, undertaken with the assistance of general practitioners and specialists, might and ought to be fruitful if the problems were first clearly defined and taken one by one by intensive study. One test should, however, be applied to all such enquiries. It should be evident that they were of a character which required not only international co-operation but a co-operation which the League Health Organisation was in an exceptionally good position to secure.

The question of a "modern international doctrine" presented greater difficulties. In England, tuberculosis was already on the wane before the discovery of the tuberculosis bacillus, before the introduction of tuberculins, before sanatoria existed, etc. These various weapons had been added to the already existing arsenal, but how could their exact value, even within a given country, be determined? If there was to be an international doctrine, ought it not to cover the fundamental questions of prosperity and poverty, housing, social conditions, the dangers of early childhood, etc. How could an international doctrine applicable to all the countries of the world be of any use to one particular country? It would seem that the best answer to make to the Government of the Serb-Croat-Slovene Kingdom would be to offer to collaborate with its health authorities in an anti-tuberculosis plan of campaign, adapted to the circumstances of the country and, in consequence, drawn up by its own authorities.

M. VELGHE wished to warn the Committee against the extent of the task which had been suggested to it. There was no need to reject it, but the Committee should begin by limiting

it if it wished in the near future to submit to the Governments, with all the authority attaching to a League organisation, concrete and effective proposals which could be immediately putin to effect.

Professor Léon BERNARD stated that Sir George Buchanan's opinion in regard to the value of direct anti-tuberculosis measures seemed to be in contradiction to the ideas of Sir Robert Philip, who attached chief importance to measures of this kind. Professor Léon Bernard believed more than ever in the utility of an enquiry aiming at research into the causes which brought about the decrease of tuberculosis throughout the world.

Moreover, what the Kingdom of the Serbs, Croats and Slovenes desired was not an indication as to anti-tuberculosis measures, which it knew as well as anyone, but the competent opinion of the League organisation—having due regard to the costs of a campaign of this nature —concerning the utility of direct measures, a question which had been much discussed even in the countries which had done most for the prevention of tuberculosis. The reply to this question was difficult but not impossible to find.

In reply to M. Velghe, he would say that if the work of the future Commission must be restricted, it would then be desirable not to call in the biologists and the clinicians, but to keep to the medico-social aspect of the question.

Dr. LUTRARIO reminded the Committee of the privileged position occupied by Italy in regard to tuberculosis, which had diminished in that country by 46 % (from 2,100 per million of inhabitants to 1,000 per million in 1914), in spite of apparent and real factors of increase :

1. Apparent factors : improvement in diagnosis of the disease and in statistical processes,

2. Real factors : industrial development, proportion of former emigrants returning with tuberculosis to their country (2.5 % to 3 %), influx of tuberculous foreigners coming to Italy for treatment.

The Decree-Law of July 26th, 1917, and, later, the Law of July 24th, 1919, by means of the facilities given to the communes to co-operate in schemes for directly combating tuberculosis, had led to a considerable development in work of this kind, which had before been very restricted. Finally, mention must be made of the collateral action of philanthropic associations, notably the Red Cross. In short, Italy constituted a valuable field for future research work, where, side by side with the more recent direct campaign against this disease, there existed the indirect efforts which had been carried out for a long time.

Sir George BUCHANAN thought that, before a permanent Commission was appointed, a Sub-Committee should study the question, and submit a report which would enable the Health Committee to agree in regard to the selection of members and the instructions to be given to the Commission.

After an exchange of views between Sir George BUCHANAN, Dr. VELGHE and Dr. RAJCHMAN, a Sub-Committee was appointed as follows :

Dr. TSURUMI (Chairman), Professor Léon BERNARD, M. VELGHE, Sir George BUCHANAN, Dr. MADSEN, Dr. LUTRARIO.

101. Report of the Commission on Instruction in Public Health (*continuation of the discussion*).

Professor Léon BERNARD wished to remove a misunderstanding, before the discussion upon his report began. In fixing spheres of enquiry, it was not intended to settle the problem for all the countries in the world in one year, nor to send enquirers into every country. Each enquirer would judge for himself of the best way of collecting documentary evidence. Moreover, any members of the Health Committee who wished to take part in the enquiries might do so. What was essential was that, within one year, and without allowing the work to exceed the financial resources, the Committee should be able to submit to the Assembly a report on at least part of the task it had to fulfil—for example, that part dealing with what was called elementary education, and as regards Europe only.

102. Epidemiological Intelligence Bureau in the Far East: Report of the Commission for the Far East.

Dr. JITTA read his report (Annex 34).

Dr. TSURUMI said that, at the present stage of the progress in the establishment of the Bureau for Epidemiological Intelligence in the Far East, the coming Conference at Singapore should discuss only those questions defined by the Health Committee when stating the functions of the Bureau in the resolution adopted during the first session of the Committee held last February. It was evident that the Bureau should function on a definite basis, namely, a basis similar to that of the Health Section of the Secretariat.

There was, however, a growing demand on the part of the Far Eastern countries for an agreement on the measures necessary for port sanitation, and, in the event of any opinion being expressed by the representatives assembled at Singapore, he would be glad if the Health Committee would authorise Dr. Norman White to transmit to it the views of the Conference on such questions as the report of Dr. Norman White or the revision of the Paris Convention.

Sir George BUCHANAN recalled the discussion which had taken place on this matter. He did not consider that the Conference had to examine the general question of a supplementary convention.

Dr. Norman WHITE understood Dr. Tsurumi's insistence, in view of the opinions of the countries of the Far East, which wished to see the question of the Convention put under way. At

the same time, the terms of reference of the Conference were perfectly definite. Moreover, the lack of replies from the Governments would not allow the Health Committee to formulate any conclusions.

Dr. TSURUMI explained that the representatives of the Far East did not ask that any decision should be taken at the Conference, but that it should examine the conditions obtaining in that part of the world.

Dr. RAJCHMAN pointed out that the Secretary-General's official letter requested the Governments to send delegates to the Singapore Conference to discuss the special question of the organisation of the Intelligence Bureau. The terms of reference of the Conference were thus definitely restricted, and, in view of the existing divergences of opinion, it would be very difficult to have the Convention discussed at the Conference, or even to hear a statement of the views of the delegates on this question.

If any Far Eastern Governments desired to summon a Conference to discuss a health convention, they were at all times free to do so, but the Singapore Conference must be confined to the question of the Intelligence Bureau, which, moreover, did not originate in any special convention, but was a mere extension of the Service at Geneva.

M. VELGHE thought that Dr. Tsurumi would be satisfied if the Committee asked Dr. Norman White, outside the Conference :

(1) To urge upon the delegates the need of replies from their Governments to the Committee's letter and to Dr. Norman White's report;

(2) To bring back information concerning the attitude of the delegates towards the Convention of Paris and his own scheme. It must be observed that, up to the present, the views of the Far Eastern countries upon this matter were unknown.

Dr. JITTA noted with satisfaction that Dr. Tsurumi's intervention did at least prove that the countries of the Far East recognised the necessity of a Health Convention.

He referred in passing to the question of the languages to be used in the work of the Bureau, and he hoped that the two official languages of the League would be employed.

Professor Léon BERNARD concurred in this suggestion.

The PRESIDENT declared the discussion of Dr. Jitta's report closed.

The report was approved by the Committee.

103. Report on the Work of the Opium Commission.

Dr. CARRIÈRE commented on the report which he had drawn up on behalf of the Opium Commission, consisting of Dr. Chodzko, Professor Jorge, Dr. Nocht, M. Velghe and himself (Annex 35). This report was in two parts. The first part dealt with the supplementary information asked for by the Preparatory Committee of the International Opium Conferences as to the estimate of 450 mg. of raw opium which had previously been adopted as the average figure for the legitimate requirements of opium per head of population per annum; the second part concerned a number of more general questions, which had already been submitteed in a report by the Mixed Sub-Committee to the Health Committee, and referred by the latter to its Opium Commission for consideration.

With reference to the first part of his report, Dr. Carrière stated that the Health Section had, in compliance with the wishes of the Preparatory Committee of the International Opium Conferences, collected further information from certain health insurance funds and from a few hospitals. This information had been studied by Professor Knaffl-Lenz, one of the experts of the Health Section, who had, on the basis of that information, established a figure of approximately 400 mg. of raw opium per head of population per annum; this proved that the figure previously accepted was not wholly arbitrary.

Professor Knaffl-Lenz had also found that the data which he had examined coincided to an remarkable degree—a further proof that the accepted figure had a real foundation, though, of course, it represented a maximum which would apply only to those countries where medical institutions were highly developed, and more especially to the European countries.

On the basis of the information supplied, Professor Knaffl-Lenz had also succeeded in establishing an average maximum of 7 mg. per head of population per annum for legitimate requirements of cocaine. All these results were set forth in the report drawn up by Professor Knaffl-Lenz, which was accompanied by a series of most interesting statistical tables. In this connection he (Dr. Carrière) desired to pay a tribute to the work of Professor Knaffl-Lenz, whose assistance had been of the greatest value to the Commission, which could not otherwise have discharged the very arduous duties entrusted to it. He proposed that Professor Knaffl-Lenz's report should be sent to the Preparatory Committee of the International Opium Conferences as the reply of the Committee and that at the same time the President of the Health Committee should send a letter setting out the comments and reservations which had been made in the report of the Opium Commission.

The second part of the report dealt primarily with the questions of heroin, propaganda against the morphine and cocaine habits, and certain proposed amendments to the Hague Convention. The Commission's conclusion in regard to heroin was that no opinion could at present be expressed as to the question at issue—namely, the prohibition of the manufacture of the drug. It was a medical problem, and would have to be discussed first of all by the medical profession; the latter would decide whether the therapeutical advantages of heroin were sufficient to compensate for the dangers arising from its abuse.

The Opium Commission thought that the idea of propaganda against the morphine and cocaine habits, put forward by a Polish representative in the League of Nations, was a dangerous one, as it might arouse morbid curiosity among the public. The Commission therefore thought that propaganda among the masses was undesirable; the only kind that was advisable was propaganda among doctors, who must be taught not to misuse narcotics in their prescriptions.

In regard to the proposed amendments to the Hague Convention (the necessity of subjecting to regulation by the Opium Commission of all preparations containing less than 0.2 per cent of morphine and less than 0.1 per cent of cocaine and heroin, and the addition of other noxious substances to those already covered by the Convention), the Opium Commission did not desire to make any change in the conclusions of the Mixed Sub-Committee's report, which had already been submitted to the Health Committee.

Finally, Dr. Carrière asked the Health Committee to approve that part of his report which dealt with these questions. He added that the Mixed Sub-Committee had ceased to exist owing to the fact that the Advisory Committee on Traffic in Opium had decided not to renew the appointment of those of its members who were members of the Sub-Committee.

Professor PITTALUGA supported Dr. Carrière's proposal regarding propaganda, in view of the fact that the vast majority of the victims of cocaine and morphine were neurasthenics, who were easily influenced.

Dr. MIMBELA asked for information as to how the figure of 7 milligrammes for cocaine had been obtained. He made reservations in regard to his own country, owing to the miners' inveterate habit of chewing coca-leaves; this would necessitate in their case a stronger dose than that contemplated.

Dr. KNAFFL-LENZ explained that this figure had only been worked out for seven European countries and did not include in any way the consumption of the coca-leaf as such. It was twice as high as the quantity which would be necessary according to the figures of the insurance companies.

Sir George BUCHANAN said that an enquiry was in progress in Great Britain into the question of the prohibition of heroin. Up to the present the persons who had been consulted seemed in favour of retaining this product.

He referred to the publicity given to the original opinion of the Mixed Sub-Committee that heroin was unnecessary as a medical remedy—an opinion constantly quoted, and repeated in the last report of the Council to the Assembly. He hoped the more cautious view expressed in Dr. Carrière's report would receive equal publicity.

Dr. Carrière's report and proposals were adopted.

The PRESIDENT thanked the Chairman and members of the Commission for the work they had done and declared that the mandate of the Commission was now completed.

104. Work of the Temporary Mixed Sub-Committee on Anthrax.

Professor OTTOLENGHI made some comments on his report (Annex 36). The Mixed Sub-Committee, composed of three members of the Health Committee and three members of the International Labour Office, had endeavoured to discover whether there existed any effective method of disinfecting hides and skins. The bacteriological experts who had been consulted thought that complete disinfection was probably impossible at present, but that surface disinfection was enough to obviate the chief dangers.

The three principal processes to which the Mixed Sub-Committee had given its attention were disinfection by means of washing soda, by means of hydrochloric acid solution and by means of sublimate—a little-known process. The Mixed Sub-Committee had decided that experimental work on the first two processes should be carried out in the laboratory through the good offices of the bacteriologists on the Sub-Committee (Dr. Nocht and Prof. Ottolenghi) and under their supervision, in conditions which corresponded as nearly as possible to those obtaining in industry. It had also been decided to set up industrial committees in certain countries which would carry out practically in the factories the processes which would be recommended by the Mixed Committee and perhaps to try at once the soda process, which the bacteriologists were inclined to consider as sufficient.

He then read the conclusions of the report of the Mixed Sub-Committee.

In reply to a remark of M. VELGHE, Professor OTTOLENGHI gave some details regarding the question of disinfection by means of gases.

Dr. JITTA said that anthrax was a disease which was almost unknown in the Netherlands. Nevertheless, in view of the transit trade in hides which passed through the Dutch ports, it might be useful to secure the co-operation of the Netherlands in the Mixed Sub-Committee's researches, and to include it among the countries in which the industrial committees in question would be appointed.

Professor Ottolenghi's report was adopted.

FOURTH MEETING

Held on Wednesday, October 1st, 1924, at 10 a.m.

Present : All the members of the Committee with the exception of Surgeon-General Cumming and Dr. Granville.

105. Report of the Commission on Instruction in Public Health (*continuation of the discussion*).

Professor Ricardo JORGE, referring to the report by Professor Léon Bernard (Annex 32), recalled the two resolutions, adopted on January 11th, 1923, and February 20th, 1924, which constituted the terms of reference of the Commission on Instruction in Public Health. The enquiry was to be restricted to the various countries of Europe and America and to Japan. It appeared from the report that, under the pretext of "developing the scope of the enquiry", there was also a question of developing it from a geographical point of view and the setting up of a vast plan of travel round the world.

The three aspects of the problem : the training of a corps of qualified technical experts, the collaboration of the medical corps and the enlightenment of the masses had been excellently stated, but the expressions "elementary education, secondary education and higher education" were less happy and were liable to create confusion. It would have been better to speak of "general or popular instruction, of medico-hygienic or professional instruction, and technical hygiene or special instruction". The report unjustly relegated elementary education to the second place, yet this branch was indispensable if it was desired to create in each nation a state of mind such that Members of Parliament and Governments would realise the primary importance of social hygiene.

With reference to the professional training of doctors, their assistance could not be secured merely by "intensive training". Hygiene was a form of social discipline, whereas the doctor was an independent person—an undisciplined person, so to speak; and in that respect the problem was one of psychology rather than of education. The field of hygiene had widened enormously and nobody could cover the whole of it. A professor of hygiene could not be expected to teach the whole of the subject in a year. The teaching of hygiene in faculties of medicine had become both physically and educationally an impossibility. Apart from that, the curricula of medical schools were already hopelessly overburdened.

In the report it was also asked "whether it is preferable or even possible that medical practitioners should themselves assume the direction of the public health services, or whether these services should be in the hands of specialist technical experts". The form of that question supplied the answer. Or course, no absolute rule could be laid down, and the Health Committee itself included one member who, though neither a doctor nor a technical expert, was an unrivalled hygienist.

What was required was the spirit of hygiene and the proper methods. The report proposed various methods of organising special and technical instruction, but did not lay sufficient stress on the great central institutes of hygiene in which the teaching and practice of public health went hand in hand. The public health services might furnish excellent material for instruction, and might in their turn derive great benefit from this close alliance with medical training and research centres. He would deal more fully later on with this important point.

With regard to the conclusions of the report, the speaker observed that it contained a draft questionnaire. The replies were the most important part of an enquiry, and the questionnaire was merely the groundwork for them. It was quite acceptable, but would gain by being amended and abridged. That, he thought, was as far as the Committee should go; when it had made the documentary enquiry, it could think about the "guiding conception", which was to be confined to those educational centres in which the teaching was most comprehensive, within the limits laid down in the original proposals.

A geographical distribution had been made among the members of the Commission, and "spheres of enquiry" had been created; this expression had an unpleasant sound, and might suggest spheres of influence, which would frighten the professors and administrations. In that case there would be talk of a threat of dictatorship, and, worse still, of control over Chairs of Hygiene. Even the standardisation of curricula in hygiene was a chimera. This division of the geographical spoils had been extended even to Turkey, Syria, Palestine and China.

Sir George BUCHANAN said that he had no intention of speaking on the general question, in regard to the importance of which the members were in agreement, especially as Sir George Newman, with his great authority, was a corresponding member of the Committee. He merely wished to lay stress on some specific points.

He noted with pleasure that there was no idea of an international "standardisation" of instruction in public health. This principle, which was applicable in the matter of serology, had

no place in the present connection. On this point, Professor Léon Bernard's report dispelled, any doubts to which the report of the *Office international d'hygiène publique* might have given rise.

The present programme aimed at studying the conceptions of the various countries in the matter of instruction in public health, the policy pursued by them and the manner in which their methods were adapted to the special conditions of the country concerned. The enquirers should, therefore, enjoy the utmost possible liberty and not be bound by any rigid questionnaire. It would also be desirable to ascertain in all cases beforehand to what degree a country would be disposed to collaborate in the enquiry or to receive the enquirers.

Finally, the Committee ought to proceed by degrees, to choose the countries one by one and to publish, at the conclusion of each enquiry, a report on the country, so as to profit by the experience acquired in the course of each enquiry and thus be in a position, if necessary, to improve the methods employed.

Professor Léon BERNARD did not think that there was any essential disagreement between Professor Jorge and the Committee. The report contained, not a statement of doctrine, but merely a programme of work. Professor Jorge's suggestion that the expressions "elementary, secondary and higher health education" should be replaced by "general, medical and special instruction" deserved to be inserted in the final text of the report. The Commission had never intended to assign a second place to popular instruction. It had only placed it second in order because it was indispensable to arrange the questions in a series and, having regard to budgetary limitations, to begin with the most pressing one.

The enquirers, when collecting documents in regard to technical and special instruction, would, in the course of their work, collect material in regard to general instruction, which would be utilised later. As regards the assistance of doctors, this was, no doubt, a psychological problem, but their mentality was capable of being modified. He quoted as an instance Denmark, where doctors were "born hygienists". That could only be due to the fact that continuous and judicious instruction in public health had succeeded in creating the atmosphere necessary to give doctors, as a general rule, the mentality of hygienists. The same observations might be applied to England and the United States. The field of public health was undoubtedly too vast to enable it to be completely explored by a professor of hygiene. It should be his ambition to inspire a spirit, in preference to making concrete suggestions. In this connection, the rôle of the professor of hygiene might be a very important one, and his teaching should be linked up with that of other Chairs.

With regard to the attributions of medical practitioners and sanitary officials, Professor Léon Bernard was personally in agreement with Professor Jorge, but it was not his duty to give his opinion in an "impersonal" report of the Commission. It was evident that conditions differed according to the country.

As regards the conclusions of the report, the questionnaire was only intended as a guide and was in no way final in character. Enquirers could utilise it as they thought fit. The expression "spheres of enquiry" was perhaps not a very happy one, but it was not ambiguous. The expression "zones of information" might be used. According to the circumstances of the case, the enquirers might either collect information or proceed to the spot, but no amount of documents could equal the value of contact with realities. There was no question, after all, of voyages around the world, although China and Syria might, for example, form an interesting subject for enquiry.

Professor Léon BERNARD said, in reply to Sir George BUCHANAN, that he was in agreement with him : there was no question of "standardising" instruction in public health; it was a matter of discovering the best methods of giving instruction and not merely of seeing what was being done in each country. The questionnaire should not bind the enquirers. In regard to the previous consent of the various administrations : sanitary administrations, public education authorities, etc., the Secretariat would take the necessary steps. The reports of the enquirers, as suggested by Sir George Buchanan, would be most valuable—indeed, indispensable, seeing that it was agreed that a report on the work already completed must be presented within one year. For the rest, he was not sure that it would be possible in a year to study all the European countries or to exhaust the whole question of the two types of instruction which had been specified as forming the first part of the study. It would be necessary to take the questions in succession.

Professor Ricardo JORGE urged that the enquiry should, in the first place, be restricted to collecting material. In exceptional cases it might appear necessary to supplement this by a journey. He recalled the difficulties which confronted the Health Committee in the matter of obtaining the requisite credits. Moreover, the credits voted for this year were allocated to special subjects : cancer, malaria, serology. It would be dangerous to use them for the journeys in question.

Dr. RAJCHMAN asked permission to explain certain points. The Committee had already been in a position to realise that it was difficult and frequently impossible to secure information by means of correspondence. It was essential that the tasks undertaken should produce concrete results. Moreover, the Assembly had never intended to specify the exact nature of the enquiries which the Committee might think fit to undertake and the general budget did not contain special items under this chapter. The journeys would not be so numerous as would appear from the report. Further, the opportunity offered by certain enquiries for which provision had already been made—for example, in Greece and Russia—of collecting documentary material concerning instruction in public health might be utilised.

In providing for enquiries on the spot, the Committee would be making no innovation. There were already precedents—for example, the enquiry in the ports in the Near East, the

mission in the Far East, the visit of the Malaria Commission to Eastern Europe. The valuable results which had thus been obtained had contributed largely towards securing the voting of new credits. The allocation of the credits pertained to the Budget Sub-Committee of the Health Committee. The scheme for the journeys would be drawn up in agreement with the Bureau of the Committee. Finally, the great importance of the enquiry to be undertaken was evident from the declarations which had recently been made to the envoys of the Committee in Persia, Greece and Russia.

The PRESIDENT supported the statements of the Medical Director. Enquiries on the spot would be a necessary condition of the task. To return once more to the example of Denmark: this country frequently received visits from public health specialists who came to investigate the reasons for its relatively favourable health conditions, which no documents would explain de quately.

Professor Léon BERNARD thought that he could meet the wishes expressed by Professor Jorge. Documentation would not be sufficient, but it was indispensable for preparing the ground. Moreover, it was evident that the Commission would only work within the limits of the credits assigned. Finally, he proposed to delete the passage in the report relating to "spheres of enquiry", which might give rise to misunderstandings perhaps more difficult to dispel than those arising in the Committee itself.

M. VELGHE declared that the 20,000 francs allotted by the Budget Sub-Committee for the enquiries relating to the study of the teaching of hygiene could not cause the Fourth Committee of the Assembly any anxiety. The subject of the enquiry was of capital importance, and M. Velghe showed from the example of the various Belgian universities how the methods of instruction in public health might influence the training of future doctors. On this question he entirely concurred in Professor Léon Bernard's opinion. He laid stress on one point: the enquirers should not be content to record the various syllabuses used in connection with instruction in public health; they should also investigate the influence of that instruction on the public mind. For this purpose alone, the journeys would be indispensable.

Dr. TSURUMI observed that the proposed investigation was fully in conformity with the idea of intellectual co-operation which was continually gaining ground in the League of Nations.

Professor Léon BERNARD warmly welcomed Dr. Tsurumi's observation. He offered to keep the Chairman of the Committee on Intellectual Co-operation informed of the progress of the work, without there being any question of collaboration.

Professor Ricardo JORGE laid stress on the disadvantages of the proposed journeys from the point of view of public opinion. Enquiries by correspondence would furnish very valuable results if the numerous representatives of the different countries who constituted the Health Committee were to undertake themselves to obtain the necesary information from competent persons in their own countries. He thanked Professor Bernard for agreeing to delete the part of the report relating to "spheres of enquiry", but he insisted that the enquiry should be restricted to obtaining preliminary information; the matter was not urgent, and it could be discussed again at a subsequent session.

He wished to touch upon another point, which was very difficult and somewhat serious. Some of the suggested investigators, extensive though their admitted qualifications might be, were not engaged in giving instruction in public health, though that was the sphere in which they proposed to examine the work of professors of hygiene.

Sir George BUCHANAN said that the discussion confirmed the views which he had already expressed : the work to be undertaken should proceed experimentally. The importance of the financial aspect of the question could not be ignored : it was essential that all expenditure should be justifiable, and the Committee ought not to enter upon a course which would involve it in constantly increasing commitments. He suggested that the report and the methods suggested therein might be approved, but subject to their execution being dependent on the observations which had been made. The suggestion of Professor Jorge regarding the co-operation of the various members of the Committee and of the Advisory Council was an excellent one. There might be countries, England for example, which might prefer to send in a written memorandum on the subject.

Professor PITTALUGA remarked that Professor Jorge's criticisms had been very valuable in bridging the gap between the different points of view. It was essential that the Committee should come to a unanimous decision. Sir George Buchanan had expressed the general views of the meeting and Professor Léon Bernard had himself proposed to amend the report in so far as it was necessary to do so. The complete and detailed programme of the enquiries would be established later, though there was no question of changing in their main lines the proposals of the Commission.

M. VELGHE desired once more to reassure certain of his colleagues as to the financial risks involved : the credits which had been granted were very limited, and the Commission on Instruction in Public Health was the least costly of all the commissions. The cost of the whole work of the Commission would not, according to the estimates, exceed 30,000 francs, 20,000 of which would be allocated for 1925.

The idea of collecting information with the help of members of the Committee was an excellent one, but the possibility of a journey through any country when necessary ought not to be excluded : a foreign investigator would generally view things more objectively than a national of the country concerned. The Commission on Instruction in Public Health had received from

the Health Committee imperative instructions, and it had complied with them to the best of its ability. It would be advisable to approve the report, subject to the amendments which had been agreed upon and with due regard for the various observations which had been made.

Dr. CHAGAS urged that the word "enquiry" should not be employed; it should be made clear that it was a question of obtaining information from professors and from the heads of Health Departments. He would point out in passing that visiting nurses were helpers of too valuable a character to be regarded merely as subordinate staff : they were veritable auxiliaries.

After further observations by Professor JORGE, Professor Léon BERNARD, Dr. CARRIÈRE and Sir George BUCHANAN, the PRESIDENT declared *the report to be adopted, subject to the amendments which had been made and with due regard for the explanations which had been given in the course of the discussion.*

106. Work of the Malaria Commission : Malaria in Greece.

The report by Dr. LUTRARIO was submitted (Annex 37).

Dr. RAJCHMAN proposed to begin the discussion by considering that part of the report which dealt with Greece, in order to take advantage of the presence of the Red Cross representative.

After a few explanatory remarks by Dr. LUTRARIO, Chairman of the Commission, Dr. RAYNAUD read this part of the report.

After some observations by Dr. CANTACUZÈNE with regard to the importance of the sanitary aspect of the problem apart from the economic aspect, and certain explanations by Dr. RAJCHMAN this *part of the report was adopted.*

FIFTH MEETING

Held on Thursday, October 2nd, 1924, at 9.30 a.m.

Present : All the members of the Committee except Surgeon-General Cumming and Dr. Granville.

107. Work of the Malaria Commission (*continuation of the discussion*).

The PRESIDENT opened the discussion on the remainder of Dr. Lutrario's report on the work of the Malaria Commission (Annex 37).

Dr. LUTRARIO regretted that he had not been able to take part from the beginning in the travels of the Commission. During that first period the Commission had been guided by Dr. Nocht, whose competence and untiring energy were well known. Notwithstanding the short time which could be devoted to each visit, especially in Italy, two very important results had been obtained : public attention had been drawn in a special manner to the problem of malaria—that alone was a moral result of considerable importance; in addition, the Commission had collected epidemiological, statistical and biological material, etc., corroborated by direct observations, which had made it possible to draw up a judicious scheme of work.

The Commission would submit two kinds of reports :

(1) Provisional reports on the incidence of malaria, on the information collected and on the observations made;

(2) A final report which would be drafted after further discussion by the Commission, and which would deal with the more interesting part—namely, the conclusions, and those factors which were of a nature to elucidate the problem.

The provisional reports, twenty in number, had already been drafted. Those submitted by Dr. Nocht, Dr. Raynaud, Professor Pittaluga, Professor Ottolenghi and Colonel James should be specially noted. At its plenary session to be held in December 1924 and at the beginning of 1925, the Commission, assisted by experts and corresponding members, would consider a first draft of the report submitted by Dr. Nocht, Colonel James and Professor Pittaluga. All the individual reports would be annexed to the joint report, which would contain practical conclusions.

The provisional report submitted at the present meeting constituted a memorandum relating to the work accomplished by the Commission. The terms of reference of the Commission covered three questions :

1. Investigation of the incidence of malaria.
2. Investigation of the epidemiology of malaria.
3. World requirements in quinine; the production, manufacture and distribution of that product.

As regards the enquiries on the spot concerning the first question, the various rapporteurs would give detailed accounts. He would content himself with merely emphasising a few points:

(1) The emissaries of the League had received a splendid welcome from the different Governments and especially from the heads of the Health Administrations, and the Chairman of the Commission had forwarded to the Administrations letters of warm appreciation.

(2) In addition to personal notes, the Minutes of the meetings held at frequent intervals by the members of the Commission during the course of the journey had been kept, together with different annexes. These documents constituted very interesting material to which the Secretariat of the Commission had largely contributed.

The second point (epidemiology) would form the subject of a general report to be submitted to the Committee during its next session.

With regard to quinine, the terms of reference of the Commission included several special points :

(*a*) Consideration of the world requirements in quinine;
(*b*) Present production and the measures for increasing that production;
(*c*) Extension of the cultivation of cinchona to fresh countries;
(*d*) Cost of production and sale price;
(*e*) Distribution by the State or sale by private individuals.

The questions of world-wide requirements and the extension of cultivation were more properly matters for the consideration of the International Conference on Quinine, proposed by the Government of the Kingdom of the Serbs, Croats and Slovenes and which had been considered by the Health Committee. A Sub-Committee, however, consisting of qualified experts, including a Dutch, English, French, German, and Italian member, would study a special aspect of the problem: the industrial production of quinine from the botanical, chemical and pharmaceutical points of view.

Professor Marchoux had been entrusted with the study of the secondary alkaloids of quinine and other drugs recommended in the case of malaria. Several reports were already in existence : for instance, the report by Sir David Prain on cinchona from the botanical and historical points of view, with a note by Colonel Gage on the cost-price of sulphate of quinine in British India (12s. per 1b of 16 oz.). Another report by Professor Giemsa explained the chemical and therapeutic properties of cinchona alkaloids. The alkaloids contained in the different kinds of cinchona were shown by means of tables, especially those contained in *ledgereana* and *succirurra;* the first variety, mostly cultivated in Java, yielded 4 to 13 gr. of quinine per 100 gr. of bark and only from 0.1 to 2,3 gr. of cinchonine; the second, on the other hand, yielded from 1 to 7 gr. of quinine to every 1.5 to 4 gr. of cinchona. The bark contained the other alkaloids, viz. cinchonidine, chonidine and amorphous alkaloids (chinoidine) in negligible quantities.

The report dealt with processes for the extraction of the alkaloids, with their chemical constitution, their synthesis, and their respective anti-malarial properties, and also with other drugs which had been recommended but were in the majority of cases of little value; vegetable substances, resen-benzenes and Metylene blue were also dealt with.

Certain conclusions contained in the report should be pointed out. Professor Giemsa placed the more refined ethers of cupreine, which can be obtained by synthesis, in the first rank for activity. The alkaloids of cinchona came next. He emphasised the small advantage there would be in isolating the different alkaloids, and recommended the employment of the total alkaloids, which were free from all toxicity and were profitable from a commercial point of view. Amongst synthetic preparations he gave details of hydroquinine as well as of quinoethyline, which would be an ideal remedy were it not for the fact that the cultivation of the *rémija pédonculata,* from which it is chiefly obtained, had been almost entirely abandoned.

In his report, Professor Marchoux arrived at the same conclusions as Professor Giemsa with regard to the advisability of employing total alkaloids; he drew attention to the effect of quinine on parasites, which could be detected even through the microscope, and stated certain facts :

(*a*) The treatment of four cases of light tertian fever with quinidin, the same results being obtained as with quinine;

(*b*) The successful employment of cinchonine as a prophylactic in Algeria by Professor Sergent;

(*c*) The less efficacious results obtained by the use of cinchonidine than by that of quinine;

(*d*) The greater efficacy of the hydro-alkaloids, but the inadequate profit derived from them;

(*e*) The very slight efficacious results obtained in the case of amorphous alkaloids and their toxicity.

In another report, submitted by Dr. Labranca, corresponding member of the Commission, an account had been given of the experiments made with cinchonine in the Medical Clinic at Rome, and in the Grossetto Hospital.

The terms of reference of the Commission included the continuation of the investigation in Albania, undertaken by Dr. Haigh with a thoroughness and knowledge which deserved special thanks. Dr. Haigh especially asked for the despatch of quinine. It would be possible to grant this request by means of funds still remaining at the disposal of the Health Section.

The investigation in Greece had been conducted by Dr. Norman White, whose competence and devotion were well known. With regard to that investigation it would be sufficient to refer to the request of the League of Red Cross Societies.

The programme for the following year might be summarised as follows :

1. Continuation of the investigations on the incidence of malaria. For this purpose journeys to the localities in question were indispensable.

2. The question of quinine : the advantages of experiments on a large scale with total alkaloids, cinchonine and the other secondary alkaloids, to be entrusted to the heads of hospitals, clinics, laboratories, mobile hospitals, etc., in malaria countries. The State factory at Turin should be able to furnish the necessary kinds and quantities of these products.

The Rapporteur read the resolutions submitted to the Committee and said he desired on his own behalf to make a few remarks. The journeys had brought out the complexity of the problem, the difficulties, the length of the struggle and the disappointments which were being experienced. The fight must be carried on by all possible means. The many-sided nature of the struggle was, moreover, peculiar to the anti-malaria campaign, but it was not, for that reason, necessary to make strenuous efforts everywhere and, at the same time, to use all available means; these latter should be adapted to the special circumstances of the case. Local conditions should be studied first of all and in an orderly logical manner. Victory would be the fruits of perseverance.

He added that he had had a memorandum drawn up on the Italian legislation, which was guided by the idea that the strength of the country lay in the fertility of its soil freed from malaria.

The Rapporteur concluded by paying a tribute to the knowledge, energy and spirit of conciliation shown by his colleagues and by the Secretariat.

The PRESIDENT congratulated Dr. Lutrario on his clear statement and paid a tribute to the other members of the Commission and their collaborators.

Dr. CHAGAS expressed his admiration for the Commission and for the experts from whom, in his capacity as head of the Public Health Services in an inter-tropical country where malaria constituted a serious rural endemic, he expected definite conclusions by which he would be able to benefit his country. The epidemiological factors of malaria in hot countries differed from those existing in the countries to which the remarks made by the Commission referred. He thought that it would be advisable to extend these observations to tropical or inter-tropical countries subject to malaria. He drew the attention of the Commission to one of the general aspects of the epidemiology of this disease. In his individual report Colonel James emphasised the importance of anopheles in houses. That point of view marked out the lines of the campaign against malaria which was carried out in some regions of Brazil, and was founded on the following facts :

Anopheles, after having bitten human beings, remained in the houses, which in this manner became centres of infection. If they left the houses, they disappeared in space and, in addition, they were enabled to lay their eggs. As the laying of the eggs was rapidly followed by death, the infected anopheles died before the development of the protozoa was completed. One of the essential conditions, rendering it possible for the female, once infected, to transmit malaria, was that she should not lay her eggs during the second or third day after having sucked infected blood. For the infection to be transmitted the anopheles must remain in the houses and especially in bedrooms. This fact having been established, the method of prophylaxis consisted in the destruction of mosquitoes in the interior of the houses every eight or ten days in order to prevent the completion of the exogenous cycle of the parasite.

Sulphur fumigations would constitute in this respect an ideal process, but they were difficult or impossible to carry out. Ordinary fumigations were, therefore, undertaken, which were sufficient for driving the anopheles outside. The excellent results obtained in this way in Brazil deserved to be known in other countries. In addition, in some regions in Brazil, special types of country houses had been erected in which mosquitoes could not remain, as they were driven out by prevailing winds. The rooms were arranged in such a way that anopheles in one of them could not pass into other parts of the house.

In malarial regions all species of anopheles had not the same importance in the epidemiology of the disease, for some of them bit man by preference, while others attacked animals. There were even some kinds the biology and habits of which varied in different regions. The facts verified in Brazil in this respect agreed with the experiments carried out in the United States. It would, therefore, be advisable, before undertaking a campaign against malaria, to attain a thorough knowledge of the biology and habits of the mosquitoes, in order that effort, time and money should not be wasted.

Some years ago Brazil had organised State manufacture of quinine with considerable advantage, and the example which long ago had been furnished in this sphere by Italy should be pointed out in malarial countries.

Dr. JITTA recalled the fact that only centres of infection of tertiary malaria presenting little danger existed in the Netherland, but that, on the other hand, there were very dangerous centres of infection in the Dutch East Indies. His country would, therefore, benefit largely by the work of the Commission. One of his countrymen had been so fortunate as to take part in journeys of the Commission.

He referred to the case of a small town in Northern Holland which had been attacked by malaria. The municipality of that town compelled the inhabitants to fight the anopheles in their houses, or, if they did not do so, undertook the work at their expense. He had noted that the Committee of Experts on Quinine was to include a Dutchman, and he hoped that application would be made for the services of a specialist in the subject of cinchona cultivation.

Professor PITTALUGA stated that the observations made by Dr. Chagas agreed with those of the Commission with regard to the importance of the anopheles in the houses.

In Russia, doctors had drawn attention to local epidemics or family infections which had occurred in winter, thereby demonstrating the importance of this epidemiological factor, which perhaps had been too much neglected in the study of the prophylaxis of malaria. The struggle in this special sphere constituted one of the means to be employed according to local conditions. It was, moreover, less expensive than certain other methods—for instance, the anti-larval campaign. The considerations set out by Dr. Chagas had been noted by the Commission and the final report would take them into account. In conclusion, he said he wished to thank the personnel of the Secretariat, and especially Dr. Lothian, for the assistance they had given to the Commission.

In reply to a question by Professor OTTOLENGHI, Dr. CHAGAS explained that it was difficult to carry out metallic protection of all houses, especially in the country. He thought that the procedure which he had indicated was the one best suited for practical purposes.

Sir George BUCHANAN congratulated the Rapporteur and said that the work of the Commission had been so exacting, physically as well as mentally, that they were all glad to see the members had returned in good health. He pointed out that, during and after the war, the return of soldiers to England who had contracted malaria in Macedonia and elsewhere had necessitated special measures in certain districts, including regulations in Great Britain as in the Netherlands empowering the authorities to enforce the destruction of mosquitoes in dwelling-houses.

After having expressed the which that the Health Committee would be allowed every facility for taking cognisance of the full report some time before its next session, he said that he hoped that the investigators would then give their opinion as to whether the malaria situation in Eastern Europe was in process of stabilisation, whether the highest point had been reached and whether there was some chance of a return to normal conditions as the population of those regions became more stationary. What, in particular, was the forecast regarding the more malignent types of malaria? Would it also be possible for the investigators to correlate their report with the memoranda received on the quinine supply? If there was really urgent need of quinine, which could not be obtained on account of the price, and if other cinchona alkaloids would serve and were obtainable more quickly and more cheaply, would it not be advisable for the Malaria Commission to advise the more extensive use of these alkaloids, of those at least which were the most economical? Meanwhile, the report presented by Dr. Nocht was full of valuable material and, in particular, he drew attention to the observations made as to the system followed in the Kingdom of the Serbs, Croats and Slovenes, in Bulgaria and amongst the Greek refugees. He concluded by expressing the hope that this report would be distributed as soon as possible, even if only in proof form.

Professor Léon BERNARD desired to associate himself with the congratulations which had been addressed to Dr. Lutrario, Dr. Nocht and their colleagues and to the Secretariat and Dr. Lothian. He wanted, however, particularly to refer to the generous and magnificent hospitality which the Commission had received from the Italian Government—a hospitality which had, in addition, relieved the Health Committee of a great deal of expenditure. He proposed that the gratitude of the Committee should be expressed to the Italian Government.

The PRESIDENT stated that he wished to associate himself with the remarks which Professor Léon Bernard had just made.

Dr. MIMBELA was also of opinion that the measures to be employed in the struggle against malaria should vary according to circumstances. He recalled the fact that remarkable results had been obtained in the Panama Canal region, thanks to the assistance of four indispensable factors : mechanical protection, drainage, the planting of trees unfavourable to the development of anophelism, and money. With regard to Peru, he would point to the successful intervention by the Government, which had resulted in the levying of special taxes, in the improvement of workmen's houses, in the distribution of quinine, and in the provision of medical assistance.

Dr. NOCHT stated that, in giving expression to its gratitude, the Committee should include the Governments of all the countries visited without exception.

Dr. LUTRARIO said that he would like to reply to certain observations which had been made. With regard to Dr. Chagas' remarks, he would point out that the question of the extension of the investigations to tropical and sub-tropical countries raised a number of problems, especially problems of a financial order. He agreed with his colleague as to the importance to be attached to the presence of mosquitoes in dwelling-houses; this problem existed in Italy also, especially in Venetia, and he drew attention to the important mechanical measures of protection which had been adopted for the houses of the employees on the State railway system. He would be much obliged if Dr. Chagas would supply him with the plans of the rural houses of which he had

spoken. Fumigation experiments had been made in Italy, even with the help of hydrocyanic acid, but the results were not yet known. The question of State quinine was essential. He was glad to know that a scheme of this kind had been carried out in Brazil and he recalled the fact that Dr. Stampar was taking the initiative in the matter in the Kingdom of the Serbs, Croats and Slovenes.

In reply to Sir George Buchanan, he said that one of the characteristics of malaria was the cycle of recrudescence and decline which could be observed every five or six years; that point would be dealt with in the final report. As regards the use of the various alkaloids of quinine as at present prepared, it would seem that the Commission would recommend that the limited experiments which had so far been made should be extended; it would be necessary in a malaria country for qualified doctors to experiment with a given product.

With reference to Professor Léon Bernard's observations, he would observe that all Governments had been equally hospitable towards the Commission and all deserved the same meed of thanks.

In reply to Dr. Mimbela, he said that the final report would certainly mention the example of Peru and refer to the results which had been obtained in Panama. It must be remembered, however, that the planting of trees unfavourable to anophelism had not everywhere proved conclusive, and he mentioned Italy as a case in point.

Dr. RAJCHMAN asked whether, at the next session of the Malaria Commission, consideration would be given to the possibility of arranging a tour, for example in 1926, in accordance with the suggestions of Dr. Chagas and Dr. Mimbela.

Dr. CARRIÈRE, referring to the remarks made by Dr. Chagas as to the necessity of studying the habits of the various kinds of anopheles, pointed out that malaria was almost unknown in Switzerland, although, as appeared from an enquiry made by a specialist of the first rank—Professor Galli-Valerio—*anopheles maculipennis* was fairly widespread in that country. Moreover, temperature conditions in Switzerland were such that, in certain parts at least, the malaria parasite could complete its cycle of exogenous development. Again, it was a fact that Switzerland contained a certain number of imported malaria cases; they had been particularly common during the war, as many of the interned soldiers were suffering from malaria.

Thus the three necessary conditions for the formation of malaria breeding-grounds—the presence of the virus-carrying insect, the existence of reservoirs of the virus, and satisfactory temperature conditions—were all combined, and yet no such centres were formed. He would be glad of information as to the causes of this phenomenon, which, it might be noted, was not peculiar to Switzerland. Possibly the anopheles had changed their habits, and now preferred animal to human blood.

The PRESIDENT informed his colleague that the reports of Colonel James and of the Danish doctor who accompanied the Commission contained information on this point.

Dr. LUTRARIO said that the point had not escaped the notice of the Commission, which would give special consideration to it when it went to Sicily and Africa, where anopheles existed without malaria.

Sir George BUCHANAN said that that was also the case in England. He offered to obtain the documentary information collected on this subject during the war, and drew attention to the data which had already been compiled by the Office international d'hygiène publique.

At the PRESIDENT's request, *it was decided to appoint Dr. Chagas to be an additional member of the Commission.*

On the motion of Dr. RAJCHMAN, *the Committee decided to add to the first paragraph of the first resolution the words* "within the limits imposed by budgetary considerations".

The report of the Commission was unanimously adopted.

108. Budget of the Health Organisation for the Year 1925.

M. VELGHE observed that the budget of the Health Organisation for 1925 contained credits for a total amount of 1,322,066 francs—*i.e.*, about 200,000 francs more than in 1924. This increase resulted from the fact that the Rockefeller Foundation had increased its grant by 100,000 francs. This further assistance called for the profound gratitude of the Committee. The Budget included expenditure which was more or less fixed and to which the Health Committee had nothing to say, and, in addition, two credits which the Committee had to apportion : 70,000 francs for "special reports and enquiries", and 142,000 francs for "special enquiries and technical conferences".

The Assembly had increased the amount proposed by the Supervisory Commission; at the same time, the sum allowed was insufficient to meet the demands put forward by the various Commissions, which amounted in all to 275,000 francs. The Budget Commission of the Health Committee had, therefore, been forced to reduce in certain proportions the claims of the Commissions.

The following credits would be granted :

Cancer Commission :	Claim :	44,000	frs.	Credit granted :	30,000	frs.
Malaria Commission :	»	90,000	»	»	70,000	»
Serological Commission :	»	55,000	»	»	40,000	»
Vital Statistics Handbooks :	»	26,000	»	»	25,000	»
(Liabilities already entered into.)						

Commission on Instruction in Public Health : Claim : 30,000 frs. Credit granted : 20,000 frs.
Tuberculosis Commission : » » 30,000 »

These estimates were adopted by the Committee.

109. Work of the Commission on Instruction in Public Health (*continuation of the discussion*).

Professor Léon BERNARD read the following text, with which Professor Jorge had expressed his approval :

"The Health Committee :

"After hearing the report of the Commission on Instruction in Public Health, together with the observations which were made in the course of the subsequent debate :

"Decides to adopt the general conclusions of the Commission with regard to :

"(1) The great importance of the teaching and popularising of hygiene for the improvement of public health;

"(2) The principles and methods according to which the information intended to enable the programme assigned to the Commission by the resolution of the Committee of February 20th, 1924, to be carried out, should be collected, whilst paying full regard to the suggestions put forward and the difficulties referred to in the course of the debate, whether of a technical or of a budgetary character."

The PRESIDENT, supported by Professor Léon BERNARD, urged Professor Jorge to accept membership of the Commission on Instruction in Public Health.

Professor JORGE said that he would be very pleased to accept the honour thus offered to him.

In reply to a question by Sir George Buchanan, the Chairman said that the detailed application of the second part of the resolution would be determined by agreement between the Chairman of the Commission and himself.

The resolution was adopted.

110. Work of the Commission on Tropical Diseases.

At the request of Dr. Chagas, the Chairman of the Commission, Dr. RAYNAUD, read the first part of the report (Annex 38) on sleeping-sickness.

Sir George BUCHANAN said that, although he was not yet acquainted with the English text of the report, he would propose that the Conference of Government representatives (to ensure liaison between the administrators and doctors on both sides of frontiers) should be advocated in the form of a suggestion rather than as a direct recommendation.

Following on observations by Dr. NOCHT and Professor Léon BERNARD, *it was agreed that the report should urge the desirability of increasing the number of doctors engaged in combating sleeping-sickness.*

Professor JORGE recalled how widespread sleeping-sickness used to be in the Portuguese colonies and how successful the campaign against it had been, and said that he was authorised to place at the disposal of the Commission the information and experience acquired by Portugal in this domain.

Dr. CHODZKO emphasised the advantages of bilateral conventions.

Dr. RAJCHMAN pointed out that the report did not exclude such conventions.

The part of the report dealing with sleeping-sickness was adopted.

Dr. RAYNAUD observed that the Commission had not been able to discuss the question of tuberculosis and read the remarks of the Committee of Experts.

This part of the report gave rise to an exchange of views between Professor OTTOLENGHI, Professor Léon BERNARD, Dr. CHODZKO, and Dr. RAJCHMAN.

The Committee decided to make no specific recommendation regarding tuberculosis, being of the opinion that the transmission of the experts' observations on this subject would suffice.

In response to a suggestion by Dr. MIMBELA and remarks by Dr. CHAGAS and Professor JORGE, the PRESIDENT suggested that the question of yellow fever might be raised at a subsequent session.

Agreed.

111. Yearly Report of the Health Committee to the Permanent Committee of the Office international d'hygiène publique : Resolution of the Fifth Assembly.

Dr. RAJCHMAN read a letter from the Secretary-General of the League to the President of the Committee (Annex 39), the report of Viscount ISHII (Annex 39 *a*) and the note by the Secretary-General containing the resolution of the Assembly, together with the interpretative declaration of the Italian delegation (Annex 39 *b*).

M. VELGHE said that he had been asked by the President to consider the question, and he read the draft of a reply to be sent to the Council.

On the motion of Sir George BUCHANAN, seconded by Professor Léon BERNARD, *the discussion of this question was adjourned until the meeting in the afternoon.*

SIXTH MEETING

Held on Thursday, October 2nd, 1924, at 3 p.m.

Present : All the members of the Committee with the exception of Surgeon-General Cumming and Dr. Granville.

112. Yearly Report of the Health Committee to the Permanent Committee of the Office international d'hygiène publique : Resolution of the Fifth Assembly (*continuation of the discussion*).

Sir George Buchanan said that he would like to make a few observations as he had been present as technical adviser to the British delegation during the discussion which had taken place on this subject before the Assembly and its Second Committee. The resolution resulted from the initiative taken by the Indian delegation. The British delegation had supported the proposal in the form in which it had been passed by a large majority in the Second Committee and also in the form unanimously adopted by the Assembly. The British delegation saw no objection whatever to the interpretation of that resolution which the Italian and other delegations had given when they voted in its favour at the Assembly.

The Health Committee was alone qualified to represent the Health Organisation before the Council and the Assembly and was entirely responsible for its course of action. The Health Committee, however, would not wish to deprive itself of the opportunity of soliciting and obtaining, with regard to its programme of work, the views of those members of the Advisory Council (*i.e.*, the Paris Committee) who were not included among its own members. This matter concerned not only distant parts of the British Empire but also all the other countries not represented by their nationals on the Health Committee.

He was very glad to see that the draft reply was virtually equivalent to an acceptance of this principle and that the Office international d'hygiène publique would be consulted on the programme of the Health Committee, both in April and in October. Personally, he thought that the Committee might decide to go further and adopt a method of procedure which would be useful and desirable purely from the point of view of the Health Committee itself. He suggested that the annual report submitted to the Assembly should first be thoroughly examined officially by the Health Committee. This document contained an official account of the work of the year and the programme for the future; the programme was submitted to the Assembly for approval and the activities of the Committee were governed by it. He did not think it sufficient that this document intended for submission to the Assembly and to the Advisory Health Council should be drawn up by the Secretariat, even after consultation with the President and, possibly, the Vice-Presidents. It would be a great advantage if the annual report were first of all submitted for approval to the Health Committee itself in April, were then sent to the Office international at Paris for any observations, and, lastly, were communicated to the Members of the League early enough for them to examine it before the Assembly.

While he did not wish, for the moment, to discuss this question of date, as he observed that the draft reply mentioned certain objections to the month of April, and as, moreover, the matter was one requiring careful consideration of detail, he thought it would be advisable to leave the question open in order that it might be examined, if necessary, at the next session. If the Committee agreed with him, he would willingly support M. Velghe's proposal, subject to a slight modification whereby it would be made clear that the proposed resolution, so far as the date of the annual report and programme was concerned, was not final and could be reconsidered in the light of experience.

Professor Léon Bernard was afraid that the proposal of his British colleague would again raise the complicated questions which had for so long delayed the permanent establishment of the Health Organisation of the League. The conciliation formula which had been adopted the year before was satisfactory to the two organisations. Nations which were represented at the Office but not on the Health Committee could easily, in view of the close relations existing between the two bodies, place their views before the latter; further, the Statute which constituted the charter of the Committee recognised its complete independence and even its right of initiative.

The Health Committee was invited by the Council of the League to express its opinion. The text submitted by M. Velghe was perfectly clear and left no room for misunderstanding; it would be well to adopt it as it stood. If it were merely a question of convenience of date, that was a secondary point which could easily be settled.

Sir George Buchanan said that he wished to clear up any misunderstanding. The position of the Indian delegation was perfectly clear; neither India nor any of the British Dominions was represented on the Health Committee, although that Committee dealt with many questions

of interest to them. It was natural that a great country like India should desire to obtain the views of the expert representatives of various other Governments and to present the views of its own experts when the general programme of work was under consideration. Indeed, the title of Advisory Health Council of the League which was given to the Paris Office was sufficient to indicate that this proceeding would come within its rele. There was no question of diminishing the prerogatives of the Health Committee. The question under discussion was one of procedure, namely, the question of date. The proposal which had been made would not involve any immediate discussion; it would do if the matter remained open until a subsequent session, and it was on that condition that he was prepared to support M. Velghe's proposal.

M. VELGHE, after drawing attention to the interpretation given to the Assembly resolution by the Italian delegation, recalled in his turn the circumstances in which the Health Organisation of the League had been created. The solution which had been adopted and for which he had worked with all the energy at his disposal respected the independence and dignity of the two organisations. On being invited by the President—in his capacity, perhaps, as Chairman of the Permanent Committee of the Office international d'hygiène publique—to prepare a draft reply to the Council, he had endeavoured to respect the agreement which had been concluded and to give an opinion which would be both clear and satisfactory to the Assembly.

As his British colleague had observed, the question was twofold :

(1) Certain Governments not represented on the Health Committee felt the need for discussing, as occasion arose, the future work of the Committee. The requirements of the Indian delegation had, in fact, been satisfied for a long time past by reason of the close collaboration between the two organisations. A further step could now be taken, and it might be decided that, at each session, the Health Committee of the League should inform the Permanent Committee of the Office international d'hygiène publique of the questions which it proposed to discuss.

(2) There remained the question of the date of the annual report. Sir George Buchanan objected to October being chosen. That objection would be placed on record; the draft reply did not fix anything for the future; it was a question of internal procedure for the Committee itself to determine, but there was no need to mention it in the report.

Dr. CARRIÈRE supported M. Velghe's proposal and urged that it should be adopted as it stood.

Sir George BUCHANAN said he concluded that if it was merely a question of internal procedure he would consequently have the right to raise it at any appropriate time in the future. The explanations given by M. Velghe in this respect had removed his fear that the proposed reply prevented the further consideration of the date and method of presentation of the report and consequently he saw no objection to the adoption of that text.

The PRESIDENT declared the draft reply to be adopted and was glad that the best advice which the Committee had received had been given to it by the Chairman of the Paris Office.

The text of the reply was as follows :

> "The Health Committee has given careful attention to the recommendation adopted by the Assembly during its present session and in which the suggestion is made that it would be desirable for the Health Committee to communicate to the Permanent Committee of the Office international d'hygiène publique the annual report setting out the questions with which the former body proposes to deal, at such a date as to permit the Permanent Committee of the Office to make, before the next Assembly, any observations to the Health Committee which appear to it desirable.
>
> "It seems to us that the end which this recommendation is intended to secure will be easily attained as a result of the close and continuous relations which have been established between the Health Committee and the Health Section of the Secretariat on the one hand and the Office international d'hygiène publique on the other.
>
> "It should not be forgotten that the close collaboration between the two Committees is the result less of the administrative communication of documents than of the actual composition of the Health Committee.
>
> "As a result of the agreement which was drafted by a Mixed Commission of Delegates from the two bodies and ratified by the Assembly on September 15th, 1923, the Health Committee comprises, in addition to the President of the Permanent Committee of the Office, nine members chosen by that body, of whom, as a matter of fact, eight are actually members of the Permanent Committee of the Office international. Under the terms of the rules of procedure of the Health Committee the President of the Permanent Committee of the Office is *ex officio* a Vice-President of the Health Committee. "Finally, the Council of the League of Nations, which has the right to nominate six members of the Health Committee and four assessors, has selected amongst the members thus chosen several who are also members of the Permanent Committee of the Office international.
>
> "This will indicate how close are the relations between these two bodies. Collaboration is, moreover, made easier by the fact that the meetings of the two Committees are as a matter of course fixed as a result of agreement between the Presidents of the two Committees, and it may be anticipated that, unless unforeseen circumstances intervene, the meetings of the Health Committee will precede those of the Permanent Committee of the Office International.
>
> "As it is in the interests of the two bodies to ensure ever-closer collaboration and to avoid duplication of work, the Permanent Committee of the Office will have

before it, at its April session, an indication of the intentions of the Health Committee with regard to the programme of work it intends to carry out.

"An understanding could also be reached to the effect that the resolutions taken by the Health Committee at each of its sessions will immediately be brought to the notice of the Permanent Committee of the Office. Thus it will be possible for the latter body to draw up, without delay, if circumstances seem to require it, its observations with regard to the opportuneness and interest presented by the studies which the Health Committee proposes to undertake.

"It goes without saying that if new questions should arise between the April and the October session, and more especially if subjects for investigation are proposed by members of the Assembly, there would be no justification for putting them aside owing to the fact that the Permanent Committee of the Office had not been able to present its observations on those particular questions. Not only would this result in a regrettable delay of a year in the examination of these questions but this line of argument as regards procedure would be opposed to the rights of the Committee and those of the Assembly. The agreement concluded with the Office international by the League of Nations recognises, as a matter of fact, the Health Committee's express power of examining, without previous consultation with the Permanent Committee of the Office, any public health question concerning the League of Nations which may be submitted to it or initiated by the Health Committee itself (Section II of the Agreement ratified by the Assembly on September 15th, 1923).

"Moreover, important considerations may be urged in support of the transmission of the annual report of the Health Committee to the Permanent Committee of the Office at its ordinary session in October, since it is only then that the budget of the Health Organisation has been fixed by the Assembly, and that it is possible to decide definitely as to what will be the questions with which the Health Organisation will deal in the course of the following year.

"In view of the fact that the annual reports will set out the questions which it is proposed to study and will indicate, subsequently, the progress or conclusion of the work undertaken, all the members of the Permanent Committee of the Office will have the opportunity, both frequently and as a matter of course, of making any observations which may seem to them desirable, and more especially, before any decision has been taken, of giving expression to their views as to the best methods that may be followed. Thus, satisfaction is given to the wish which seems to have moved the proposers of the original recommendation submitted to the Second Commission.

"In conclusion, it may be said that, whilst reserving the right of the Health Committee to examine all public health questions concerning the League of Nations which may be submitted to it or which the Committee itself may initiate, satisfaction will, as a matter of fact, be given to the Assembly's recommendation without it being necessary to change the date of transmission of the annual report which is to be forwarded by the Health Committee of the League of Nations to the Permanent Committee of the Office international d'hygiène publique."

113. Work of the Tuberculosis Commission.

Professor Léon BERNARD read his report (Annex 40).

Professor OTTOLENGHI wished to draw attention to certain matters of detail. He recalled the remarks he had made at an earlier sitting on the importance of a study of the action of tuberculine not only in early diagnosis but also as a means of endeavouring to ascertain the stage of the tuberculous infection, whether it still existed, and was latent or active.

The second part of Dr. Tsurumi's proposal dealt with researches in connection with vaccination. For experiments on persons only statistical methods would at present be available, and these required a long period of time. If a biological test existed whereby immunity in respect of the bacillus could be revealed, it would be possible to make much more rapid progress in the experiments with the different vaccines. He accordingly proposed that, in the early part of the report, Article 2 of the points submitted to the Committee should be slightly amended in the sense he had indicated.

A little further on in the report only the "toxicity" of the tuberculins were mentioned, but the tuberculins might have other effects that fell within the clinical province.

Again, the proposition that "tuberculosis is decreasing throughout the whole world" did not seem to be entirely exact and it would perhaps be desirable to substitute for it a less general and optimistic phrase.

Professor JORGE insisted on the accuracy of the last observation, and pointed out that not only might the partial decrease in tuberculosis be attributed to causes not specified in the report, for instance immunisation, but, according to English, Norwegian and Danish statistics, this decrease had taken place prior to the employment of recent methods of hygiene and to recent scientific discoveries.

Dr. CANTACUZÈNE observed that it would be more correct to speak simply of "the action of the tuberculins" instead of their toxicity.

Dr. CARRIÈRE asked Professor Léon Bernard what the relations were to be in this connection between the Committee and the International Union for combating Tuberculosis.

Dr. CHODZKO pointed out the importance, for new or re-organised countries that were preparing to draw up a general plan of campaign against tuberculosis, of the Committee's work on the social aspect of the question. Since the report referred to the value of the assistance given by specialists, he would like to mention the names of Professor Bang of Denmark and Dr. Sterling of Poland. He concluded by expressing the hope that the Secretariat would be able to submit substantial results to the Committee in April.

Sir George BUCHANAN wished for an explanation of the phrase at the end of the report dealing with the methods of statistical documentation. If the British Ministry of Health, for instance, were to be asked to throw light on a question it would be unfortunate if they were bound by the terms of the report.

Dr. RAJCHMAN said that these expressions should not be interpreted in a limitative sense.

The expression "titration of the tuberculins" and the term "charlatanism" gave rise to various comments.

The PRESIDENT proposed to insert in Article 2 of the programme of study the words "fixation of the complement".

Professor Léon BERNARD said that his report would be amended in accordance with the various observations that had been made.

Replying to Dr. Carrière, he explained that the International Union, realising that an organisation like the League of Nations was alone capable of collecting the required information regarding the efficacy of the social measures, had asked him to consider this aspect of the question.

He thanked Dr. Chodzko for the two names suggested.

Finally, he informed Sir George Buchanan that the Medical Director had correctly interpreted the passage of the report concerning the assistance to be asked for from competent authorities.

The report was adopted subject to the modifications suggested in the discussion.

114. Enquiry into the Sanitary Conditions in Persia.

The PRESIDENT asked Dr. Gilmour to take his seat at the Committee table.

A preliminary statement was read in which Dr. Gilmour described the general conditions he had observed in Persia. It constituted so to speak an introduction to the much more detailed technical report in which he has recorded his observations and which will be distributed later.

This statement led to an exchange of views between the various members of the Committee. It was agreed that, circumstances permitting, the Committee should officially discuss the question at its April session; if a decision had to be taken in the meantime, the Bureau of the Committee would make the necessary arrangements.

The PRESIDENT, on behalf of the Committee, congratulated Dr. Gilmour on his very interesting statement, which enabled the members to realise the difficult conditions under which he had so admirably discharged his task.

SEVENTH MEETING

Held on Friday, October 3rd, 1924, at 9.30 a.m.

Owing to the departure of Dr. Madsen for the United States, M. Velghe took the chair.

115. Action arising out of the Proposal of the Netherlands Government concerning Quarantine Clearance of Ships : Report of the Commission.

Dr. JITTA read his report (Annex 41).

He added that it was proposed to submit at the earliest possible date articles to serve as a basis in drawing up future bilateral conventions; these articles might be laid before the Committee at its next session, after which a Mixed Commission, consisting of members of the Advisory and Technical Committee for Communications and Transit and the Health Committee, would meet in order to examine them.

Dr. CHAGAS did not wish in any way to criticise the report just submitted but pointed out the desirability of the Committee taking steps to organise an international service of maritime sanitary inspectors, as this was the only possible way of ensuring port sanitation in the various countries.

The existing procedure for the sanitary inspection of ships in port was inadequate, and, in most cases, utterly ineffectual against the introduction of epidemics, in which germ-carriers played the most important part; the latter did not come under the sanitary measures taken in the ports on the departure of vessels. The danger was very serious when one took into

consideration the numbers of persons, travellers and emigrants from every country who were carried on transatlantic vessels. Moreover, the health officials at the ports of destination were not always aware of incidents that had occurred during the voyage and which permanent control alone could have verified.

Apart from such considerations and others, chiefly of a technical nature, the proposed measure would offer economic advantages, in view of the improvement in international communications which would result from the presence of health inspectors on board, as vessels would then be exempt from health inspection in port. The measure no doubt presented difficulties, but these were less serious than the short-comings and practical drawbacks of the existing system.

It was the duty of the Committee to endeavour to reconcile the interests of port sanitation and those of international trade. Accordingly, while supporting the Dutch proposal, he (Dr. Chagas) would urge his colleagues to examine it at leisure, with a view to arriving at a definitive solution; the collaboration of the Transit Committee might be secured. The maritime health inspection service was essential, at all events in the case of long voyages, and would certainly be readily accepted by the big steamship companies. It might also play an important part in the campaign against venereal diseases, which was to form the subject of an international conference.

Sir George BUCHANAN thought that the title of the Commission over which Dr. Jitta presided should indicate more exactly the real object of its work, which was to consider individual agreements which might advantageously be concluded between different countries in regard to quarantine.

Dr. CHAGAS' proposal seemed to be one from which certain countries situated in the same part of the world might derive mutual benefit. It must not be forgotten, however, that in such matters problems arose which were not concerned with theoretical but with practical hygiene : it was necessary, on the one hand, to prevent epidemics spreading through the agency of vessels, and, on the other, to take into account the practical requirements of shipping. These two aspects of the question would not escape the notice of the delegates to the Conference which was to revise the Sanitary Convention of 1912. It was easy to realise that the health inspector who travelled with the ship and examined passengers to see if they were germ carriers or suffered from venereal disease might not find himself welcome.

Dr. TSURUMI pointed out that few, if any, agreements existed between the Far Eastern countries in regard to port health procedure. This was not the time to explain why the Japanese Government had not accepted the Paris Convention, which did not pay sufficient regard to the position of the Far Eastern countries. While he could not state his Government's present views as to the revision of this Convention, he was of opinion that any such revision should take into account the special position of that part of the world where the recurrent danger of plague was a vital problem. The Japanese Government would not fail to explain its views in its reply concerning Dr. Norman White's scheme, and he (Dr. Tsurumi) hoped soon to be able to give the Committee more definite information.

Dr. NOCHT was of opinion that Dr. Chagas' proposal would ensure that permanent supervision, or supervision extending over prolonged periods, which was essential in order to safeguard shipping. It would obviously raise difficulties : vessels would be obliged to have on board not only health officials but also the requisite apparatus. The proposal was closely connected with the Dutch proposal, the chief object of which was to exempt from sanitary inspection vessels which had already been inspected in another port; under the present system "free clearance" might be dangerous when a vessel stopped in port only for a very short time—perhaps two or three hours—which was insufficient for the port health authorities to carry out a complete inspection; it would be different if the vessel had qualified medical officers on board.

Dr. JITTA thanked his colleagues for their support. Dr. Chagas' proposal deserved close attention but seemed likely to present great difficulties; its application would depend to a large extent on the geographical position of the countries concerned. Dr. Tsurumi's statements called for a similar remark. The draft articles to be submitted would serve as models, but the detailed provisions would vary according to the countries concerned; they could hardly be identical, for instance, as between Belgium and the Netherlands and as between Japan and Europe.

The report was adopted.

116. Work of the Cancer Commission.

Sir George BUCHANAN read the report of the Commission (Annex 42). He directed the attention of his colleagues to the three memoranda referred to in paragraph 9, which contained valuable information.

The enquiry was already bringing out points of considerable utility to the study of cancer in every country. When the enquirers worked out a line of investigation in one of the three countries chosen, they reported the method used and the results as they were obtained—for example, the tables which gave the probability of death from cancer according to age, sex and the site of the disease. Moreover, the international enquiry had already served as a useful stimulus to national investigations. The research work undertaken had led to the revision of statistical tables in England and the furnishing of fuller data. Other countries would no doubt follow suit.

This would lead to an improvement, not only in regard to data but also, in all probability, in regard to methods. One of the points which had been brought out as regards England was that, in two-thirds of the cases of death recognised as due to cancer of the breast, operations on

the average had not been performed until the disease had reached a stage which was undeniably late, and in the remaining third there was no surgical treatment whatsoever. The corresponding facts in the other countries were being ascertained.

He wished to direct attention not only to the numerous offers of collaboration which had been received from the various countries and which testified to the interest aroused by an enquiry of a new kind undertaken under the auspices of the League but also to the enthusiasm shown by the various persons and administrations consulted.

The PRESIDENT congratulated Sir George Buchanan on his excellent survey of the subject. The results already obtained were, if not decisive, at all events significant, and Dr. Eichel's note, which was distributed at the same time as the report (Annex 42*a*), deserved special attention.

Dr. LUTRARIO stated that he had submitted a report for Italy summarising the position as regards work in that country, and also two statistical reports prepared by an expert attached to the Commission; the two latter documents might be referred to the Statisticians Sub-Committee for consideration at its next session. He wished to drawn attention to two facts :

1. *Correlative calculations.* — It had been noted in Italy that, in certain districts with a high birth-rate, the incidence of cancer in women was lower than elsewhere. Dr. Jitta might remember that, at Rome, Senator Pestalozza had published the results of thirty years' observations at the Obstetrical Clinic, of which he was Director, and that these observations pointed to an identical conclusion, which the scientific data now collected appeared to confirm. In accordance with the plan decided upon at Rome, correlative data had been collected between the birth-rate and the incidence of cancer of the uterus in women in different age-groups. The remarkable point was that the co-efficients of correlation were all inverse : the higher the birth-rate, the lower the incidence. Statisticians in the various countries could perhaps confirm these results.

2. *Dr. Eichel's Note.* — Recent statistics published by the United States Trade Returns Department showed that persons born of Italian mothers were less subject to cancer than persons born of British mothers; the rate of mortality for persons born of Dutch mothers came between these two. Thus the results established in the United States corroborated the facts which formed the starting-point of the work of the members of the Commission. These results appeared to be connected with the theory of constitution, which had assumed such importance in Italian medical circles.

In this connection, Dr. Lutrario submitted to the Committee a summarised account of a lecture given by Professor Fichera.

He added, in conclusion, that the continuation of such research work would allow of important progress being made towards the solution of the cancer problem.

The PRESIDENT thanked Dr. Lutrario for his learned explanations, which he had at the same time made so interesting.

Dr. CARRIÈRE submitted to the Committee a pamphlet consisting of an introductory note, statistical tables and graphs showing the incidence of cancer in Switzerland. He wished to call the attention of the Committee to a number of interesting points connected with the present international enquiry :

(1) His investigation covered a period of twenty years. Mortality statistics showed little variation between 1901 and 1920. The average mortality rate had been about 12 per 10,000. The increase, which appeared to be fairly general, had not affected Switzerland; the Swiss mortality from cancer was still, however, proportionally one of the highest, being exceeded only by that of Denmark.

(2) He pointed out the importance of certain regional factors : the mortality in the north and north-east of Switzerland was higher than in the south and west, and these divisions corresponded to the three racial divisions of the country : German, Italian and French. It would be interesting to pursue these researches. The fact that these statistics covered a period of twenty years appeared to show that the regional incidence of mortality in Switzerland was determined not by chance circumstances but by some definite factor.

(3) The rate of mortality from cancer remained practically the same for both sexes.

(4) As was well known, death from cancer in Switzerland, as in the Netherlands, was chiefly the result of diseases of the digestive organs, more especially the stomach, amounting to more than 75 per cent of the total. It would be interesting to investigate the causes of this.

(5) The pamphlets contained a red map showing the incidence of goitre among recruits, including all stages of hypertrophy of the thyroid, from simple enlargement to the large nodular goitres. This map coincided to a certain extent with those showing the deaths from cancer in the country.

The Valais region was certainly an exception to this, but it no longer deserved its unfortunate reputation as the home of goitre, and, owing to the fact that places were far apart and that communication was difficult, deaths were not very accurately registered. The matter was, therefore, doubtful.

Investigations were being continued, and it was to be hoped that if international research was extended to Switzerland it would one day be of assistance in these investigations.

Dr. Alice HAMILTON informed the Committee of the results of certain experiments recently carried out in the United States and not yet published. They were originally made in connection with the birth-rate but had yielded valuable data concerning cancer.

It had been noted in the United States that women born of Italian mothers were more prolific and less subject to cancer than women born of British mothers. The contrast was very marked. A study had been made of the relation between diet and fertility, and subsequently of the relation between diet and cancer.

In the course of experiments on rats at the University of California, it had been proved that if deprived of vitamin A they became sterile, and that fertility was restored if they were given green vegetables, cod-liver oil, wheat-flour or bran. The favourite food of Italians in the United States was mainly wholemeal bread, green vegetables and olive oil. From the various observations recorded it would appear that some relations existed between diet and fertility, on the one hand, and diet and cancer on the other.

Dr. JITTA explained that, if the enquiry in the Netherlands had not reached such an advanced stage as in Great Britain and Italy, that was partly due to the fact that in each of the three countries five hundred cases had had to be collected and carefully described; this obviously took longer in a country with a small population than in a more populous one. There were, however, already between three hundred and three hundred and fifty such cases, and it would doubtless be possible to submit a more detailed report at the next session.

He desired to thank Dr. Lutrario and the Italian doctors, particularly Dr. Fichera, who had given so great an impetus to the Commission's work at Rome.

Professor Léon BERNARD referred to the value of the facts established by Dr. Eichel and confirmed by Dr. Alice Hamilton's statement and Dr. Carrière's enquiries. The results obtained in America were of special importance because every form of cancer had been investigated. In comparing cancer with other diseases—tuberculosis, for example—it must be remembered that variations in incidence according to race were undoubtedly one of the characteristics of cancer. One conclusion to be drawn from that was that, as had already been anticipated, the Commission's investigations would have to be extended and outside enquirers called in.

As both the terms of reference of the Commission and its resources were limited, it would be desirable for the Health Committee to endorse the proposal in the report regarding outside correspondents, who, both by their own work and by sending documents, would contribute largely to the Committee's work, while no further expenditure would be entailed.

He added that France was not behind other countries, either in the matter of cancer research or in its practical application; and he referred to the establishment of anti-cancer centres, one of the advantages of which was to obviate undue delay in operation.

Dr. CHODZKO said he was greatly impressed by Dr. Carrière's diagram showing the cancer death-rate according to the sexes and the site of the disease; he was also interested in the differences in the death-rate of the sexes from cancer of the alimentary canal. He would not ask for explanations but would like to call the attention of the Cancer Commission to the importance of this question.

Dr. CANTACUZÈNE fancied that diet played a considerable part in the incidence of cancer. It was well known that cancer was almost non-existent among negro tribes. It would be interesting to find out whether cancer was as common among negroes as among whites in the United States and what might be the influence of diet and heredity upon these negroes from the point of view of cancer.

Dr. TSURUMI supported the Rapporteur's proposal regarding foreign correspondents; he drew attention to the experiments made at Tokio, in which cancers were produced in mice by the use of tar.

Dr. MIMBELA said that the Peruvian health services had not at present any data enabling them to reply to the questionnaire. The commonest forms of cancer appeared to be uterine, mammary, buccal, gastro-intestinal and cutaneous. Recent discussions at the meetings of the Peruvian Surgical Society had shown to what a large extent neglect in connection with operations had contributed to the cancer death-rate in Peru; this neglect was due to objections on the part of the patient to drastic action. The intensive campaign of social education against cancer which that society had recently undertaken would perhaps change this state of affairs.

He had greatly appreciated Dr. Lutrario's statement, but, with regard to the question of pregnancy, he put forward what appeared to be the predominant view in surgical circles, namely, that pregnancy produced traumatisms which were favourable to the development of cancer.

The report was adopted.

The PRESIDENT congratulated the Rapporteur and the Commission on their work. The latter would, no doubt, bear in mind the various observations and suggestions which had been offered.

117. Work of the Waterways Commission.

Dr. CHODZKO gave a brief historical survey of the question of the preparation of a Convention on the Health Supervision of Traffic over Navigable Waterways. The Mixed Sub-Committee of the Health Committee and the Advisory and Technical Committee for Communications and Transit had drafted a model text for a Convention on the Health Supervision of River Traffic; this text embodied certain modifications in the provisions adopted by the Health Committee in February 1924 (Annex 43). Dr. Lutrario had undertaken the heavy task of drafting the Convention, and the representatives of the Advisory and Technical Committee for Communications and Transit had assisted in a most conciliatory spirit.

Dr. LUTRARIO also laid stress on the conciliatory spirit displayed by the representatives of the Transit Committee. Compromise formulæ had been adopted on certain points, and two slight modifications had been made in the original text :

1. In Article 19, for the words "showing definite symptoms of, or suspected of suffering from", the words "showing symptoms of" were substituted as being sufficient.

2. Article 22 (new) : The provision whereby vessels on which the hygienic conditions were unsatisfactory were to be subjected to special supervision was omitted.

On the other hand, the provisions concerning rats and plague were accepted.

Although the draft Convention was not of a compulsory character, it was of great importance in view of the development of traffic on navigable waterways.

In reply to a question from Dr. CHODZKO, the PRESIDENT explained that the procedure to be adopted was as follows : the text of the draft Convention would be sent to the Office international d'hygiène publique, which should be consulted before the document was sent to the Governments.

In answer to another question by Dr. Chodzko regarding the termination or renewal of the term of office of the Navigable Waterways Commission, the PRESIDENT stated that the Commission would continue to exist in order to reply to any observations which might be made by the Office international d'hygiène publique, and also to meet the case which might arise, if the Convention were approved, of two countries requiring further information with a view to the conclusion of a bilateral agreement.

118. Resolutions adopted by the Conference on Emigration and Immigration at Rome in May 1924.

Dr. RAJCHMAN reminded the Committee that this Conference, which was held at Rome in May last, decided to transmit a copy of its resolutions to the Governments and international organisations, which would take suitable action upon them so far as might lie within their scope. The Committee had received this document as had the other technical organisations of the League.

He then read the resolutions dealing with matters of health in connection with immigration and emigration, and called particular attention to Resolution 16 (Draft International Sanitary Code). These resolutions would doubtless be discussed at the Conference for the Revision of the Paris Convention. The Committee would probably wish to study them in good time and to refer them with that object to the Commission presided over by Dr. Jitta.

Professor Léon BERNARD considered that when preparations were made for the new Conference on Emigration it would be desirable for the Secretary-General to take steps to secure adequate representation for the Health Organisation.

Dr. RAJCHMAN pointed out that the Conference for the Revision of the Health Convention, which would probably take place before the Second Conference on Emigration, would study the question in its technical aspect.

The Committee decided to place the examination of the resolution of the Conference on Emigration on the agenda of its next session.

119. International Investigation into the Question of Disinfection : Proposal of Dr. Chodzko.

Dr. CHODZKO read the text of his proposal (Annex 44), together with a statement of the arguments upon which it was based.

Professor Ricardo JORGE expressed the hope that Dr. Chodzko's proposal would be acted on as soon as possible. Existing methods of disinfection were to a large extent useless, ineffectual, and unduly expensive.

Professor OTTOLENGHI stated that he was fully prepared to accept Dr. Chodzko's proposal, which referred to a question of the greatest interest in connection with the prophylaxis of infectious diseases and which up to the present had not been adequately developed in all countries. Some countries, although possessing a well-developed organisation for public health, were backward in respect of regulations and methods of disinfection. He also agreed as to the importance of a careful examination of the question of the two types of disinfection, regarding which there had been some controversy—namely, disinfection during the course of the disease and disinfection after the disease had run its course. In certain countries, the first method had been considered more effective and the latter had been more or less completely discarded. He, personally, was of the opinion that this conclusion could not, at present, be generally accepted; there were countries in which the second method only could really effectively be applied, and it was, therefore, in practice the most efficacious in those countries.

Dr. CHAGAS also supported the proposal. The directing bodies of health services which endeavoured to bring disinfection processes up to date had often to contend with strong opposition which would probably give way before the authority of an organisation such as the Heath Committee of the League.

Professor OTTOLENGHI and Dr. LUTRARIO pointed out that it would be interesting to collect information from municipal authorities in countries, such as Italy, where the detailed regulations for disinfection and their application were left to the commune. The documents thus collected would, moreover, enable the practical results achieved in the matter of disinfection to be placed on record, and perhaps made accessible to the general public.

Sir George BUCHANAN said that in England also the central administration confined itself to laying down general principles but that the action taken was at the discretion of the local authorities which carried out the legal powers for requiring disinfection. Nevertheless, the Secretariat should send its requests for information to the central administration, at least so far as Great Britain was concerned. If information was collected, it should be sought from as many countries as possible, and members of the Advisory Council might consequently also be consulted. He understood that the task of the Secretariat would consist in obtaining and codifying information for the use of the Health Committee at a subsequent session.

The PRESIDENT, summing up the debate, said that the Secretariat would send its requests for information not directly to municipalities but to central health administrations, whose business it would be to supply the information required. Enquiries would bear upon current disinfection, final disinfection, processes, substances employed, and administrative regulations. He further suggested that, whole collecting this material, the Medical Director might immediately circulate to members of the Committee any text which might be of the nature of an innovation of interest to health administrations.

Dr. Chodzko's draft resolution was unanimously adopted.

120. Appointment of three European Medical Officers as Health Advisers to the Turkish Government.

Sir George BUCHANAN asked whether information could be obtained as to what stage had been reached in the question of the appointment of Health Advisers to the Turkish Government, as provided for in the Treaty of Lausanne.

Dr. RAJCHMAN replied that the Turkish Government had not yet sent a reply to the Health Committee's letter. He suggested that the President might take advantage of the presence of Turkish delegates in Geneva to enquire into this matter.

Dr. Rajchman's proposal was adopted.

121. Publication of a Report by Dr. Piccinnini on the Health Organisation of the United States.

Dr. RAJCHMAN informed the Committee that he had received from the Italian Health Administration an interesting report presented by Dr. Piccinnini, in consequence of his participation in the American Interchange visit in 1923, on the health organisation of the United States, together with a request for publication. According to the regulations the Committee could not consider a request of this kind until publication had been approved, not merely by the health administration under which the author of the report was working but also by the administration of the country which formed the subject of it. He (Dr. Rajchman) would therefore consult Surgeon-General Cumming before referring the matter to the Bureau.

Agreed.

EIGHTH MEETING

Held on Saturday, October 4th, 1924, at 9.30 a.m.

In the chair : M. VELGHE.

Present : All the members of the Committee with the exception of Dr. Granville.

122. Welcome to Surgeon-General Cumming.

The PRESIDENT, on behalf of his colleagues and himself, welcomed Surgeon-General Cumming and expressed his keen satisfaction that he was able to assist the Committee with the completion of the present session's work.

123. Appointment of three European Medical Officers as Health Advisers to the Turkish Government (*continuation of the discussion*).

The PRESIDENT stated that, in accordance with the instructions given him by the Committee, he had had a conversation with His Excellency Fethy Bey on the question of the appointment of health advisers to the Turkish Health Administration. In the course of this conversation it appeared that the Turkish Government had undoubtedly not yet answered the letter from the Health Committee in view of the fact that the Treaty of Lausanne had not yet been ratified. The President however, had pointed out that the question was somewhat urgent as the Treaty of Lausanne had just been ratified by France and Great Britain. He added that, before asking

for candidates for the posts provided for under the Treaty, it was essential that the Health Committee should know how the future Commissioners would be treated by the Turkish Government; they should enjoy, in their relations with the Turkish authorities, the necessary prestige. Fethy Bey had appeared to agree with this view and undertook to discuss the question with his Government.

Sir George BUCHANAN hoped that the action of the President would achieve the results desired. It was important to make progress in this matter. The Committee had decided, during the earlier discussion on this question, that the President, in consultation with the "Bureau", might at any time, if he thought fit, send a representative of the Committee to Constantinople or to Angora to discuss the question. He understood that the decision still held good.

124. Approval of the Report of the Medical Director.

The PRESIDENT called attention to the fact that, under the Rules of Procedure, the Committee was required simply to approve the Medical Director's report. He thought, however, that his colleagues would join him in congratulating Dr. Rajchman on his report, and he proposed that the Committee should adopt the following resolution :

> "The Health Committee, having taken note of the Medical Director's valuable report, decides to approve it without reservation."

This resolution was adopted unanimously.

125. Report to the Council on the Work of the Committee at its Third Session.

Dr. RAJCHMAN submitted a draft report which included, in connection with each subject, a very brief summary of the reports and an analysis of the resolutions adopted. Certain questions, such as the resolutions of the fifth Assembly, tropical diseases, the situation of the exchanged populations in Greece, and the teaching of hygiene, had been explained at somewhat greater length because the meaning of the resolutions adopted on these questions would not be clear without a detailed commentary on the reports.

Articles I and II were adopted without discussion.

Article III was adopted with slight drafting alterations; in particular, on the proposal of Dr. Carrière, the paragraph concerning preparations containing less than 0.2 % of morphine and less than 0.1 % of cocaine and heroin was drafted as follows :

> "The Committee thought that it would be desirable to consider whether preparations containing less than 0.2 % of morphine and less than 0.1 % of cocaine and heroin should not be equally subject to the control provided for in the Hague Opium Convention."

On the proposal of Professor Léon BERNARD, an addition was made to the first paragraph of Article IV, as follows :

> "The Commission on Instruction in Public Health, which was set up by a resolution of the Health Committee at its first session, *laid down the principles by which its labours are to be guided,* and presented, etc."

Article IV as amended was adopted.

Articles V and VI were adopted.

Article VII was adopted with slight drafting alterations proposed by Sir George BUCHANAN— notably, in the paragraph referring to a Conference of Government representatives with a view to liaison between administrative departments.

Article VIII was adopted.

In Article IX, on the proposal of Sir George BUCHANAN, the sentence "the Belgian and Dutch members of the Committee declared themselves willing to submit a model convention of this kind to their respective Governments for consideration" was omitted on the ground that nothing should be said on this point until the results of the enquiry were to hand.

Article IX thus amended was adopted.

Article X was adopted.

In Article XI, in connection with the sentence "should any modifications appear desirable, it would seem necessary to subject the proposal to further discussion by both these organisations", an exchange of observations took place between Sir George BUCHANAN and Dr. RAJCHMAN.

The PRESIDENT explained that the significance of this sentence was simply that, as the draft convention had been drawn up by the Committee in collaboration with another body, if occasion arose for it to be altered this should not be done without consultation with that other body.

The article was adopted.

On Article XII, a discussion took place between Sir George BUCHANAN, the PRESIDENT and Professor Léon BERNARD on the conditions under which correspondents might voluntarily send to the Health Organisation information concerning cancer. If there were any question of remuneration, that should not be contemplated until after work of special importance had been sent in.

On the proposal of Professor Léon BERNARD, the paragraph regarding the facts established in the United States became the last paragraph but one of the article, and the following words

were added: "as these data coincide with those afforded by the statistics (of the three countries) which have served as a starting-point for the enquiry".

The Article was adopted with a few alterations in wording.

Article XIII was adopted.

Article XIV was so drafted as to allow greater latitude to the authors of the final report in case the data collected should not completely cover all the points under consideration.

The Article was adopted with a few alterations in wording.

Articles XV and XVI were adopted (Annex 45).

126. Protection of Children.

Dr. RAJCHMAN read the resolution adopted by the Fifth Assembly on September 26th (Annex 29).

The PRESIDENT called the attention of his colleagues to this resolution. The Assembly had recognised that the question of the protection of children concerned the Health Committee from the special point of view of hygiene, which was one of its most important aspects. It was not yet known how the new Advisory Commission was to be composed. He suggested that steps should be taken at once to see that the Health Organisation was adequately represented on that Commission.

Dr. RAJCHMAN proposed that the Committee should address a recommendation to the Council to that effect.

Sir George BUCHANAN was not sure whether the Committee could come to a useful decision on this point at the end of its sessions, as proposed. It would, he thought, be better to await events and see what was the scope of the action taken on the Assembly resolution. That resolution already specified that the Health Organisation should be consulted on a number of questions which were within its competence.

Professor Léon BERNARD feared that if the Committee did nothing it would be faced with a *fait accompli*. He thought a moderate recommendation might be adopted, suggesting that the Council should act on the desired lines.

Dr. JITTA agreed. The Assembly had perhaps not fully appreciated the important part played by hygiene in the problem of the protection of children.

A discussion took place among the members of the Committee on this question.

Sir George BUCHANAN feared that, if one or two members of the Committee were nominated to serve on the new Commission, it would be difficult for them to know with sufficient precision what the special conditions were in countries other than their own. Health questions did not cover the whole sphere of "protection of children". In England, for instance, where social work played such an important part, the protection of children was to a large extent undertaken by philanthropic organisations and by ministerial departments which were not concerned with questions of health. The question was regarded so differently in different countries that he considered it would be better for the Health Organisation to be represented by one of its medical staff at the Secretariat who could communicate with the whole Committee, if necessary.

He took the opportunity to mention that, at the request of the Secretary-General, he, on behalf of the League, had attended the Third English-speaking Conference on Infant Welfare, which was held in London from July 1st to 4th last. He could supply any of his colleagues with copies of the report of that Conference, which, at present, was in proof form. They would be able to gather from that report in what manner social workers, official and voluntary, were dealing with some of these questions of the protection of children in English-speaking countries.

In conclusion, he declared that there was no fundamental divergence of views between his colleagues and himself; he was only anxious to put them on their guard against the appearance of demanding more for public hygiene than public hygiene could bear in practice.

Dr. Alice HAMILTON supported Sir George Buchanan's remarks; many child-welfare organisations in the United States would not agree to their activities being confined to the domain of health. If a resolution were adopted it should be drafted in such a way that it could not be interpreted in the United States as meaning that the whole problem of the protection of children had been placed in the hands of hygienists and medical men.

The PRESIDENT emphasised the importance of health where the protection of children was concerned, particularly as regards social work, juvenile offenders, mentally deficient children, etc.

Professor Léon BERNARD suggested that it might be possible to set up a Commission on the Protection of Children within the Health Committee; in this manner, even though the Committee might have no more than one or two representatives on the new Advisory Commission, the other members would have every facility for making their views known.

There was no intention of denying the admirable work done by social workers either in England or in the United States; it was merely a question of reminding the Council of the important place occupied by health considerations in the protection of children. Moreover, it was important that a stand should be made against this exaggerated dualism which tended completely to separate social from medical work. The two must be linked together in order not only to render social work effective but also to instil a social spirit into the medical profession.

Dr. JITTA re-read the first four points of the Declaration of Geneva, voted by the Assembly on September 26th, and showed that each of these points raised questions of health.

The following text, submitted by Professor Léon BERNARD and recast in accordance with the suggestions of Sir George BUCHANAN, *was unanimously adopted as Article XVII of the report to the Council.*

> "The Health Committee,
>
> "Having noted the resolutions adopted by the Assembly with regard to the protection of children—and more especially numbers 4 and 5 of these resolutions :
>
> "Considers it to be its duty to point out to the Council that health matters occupy a prominent, or even essential, place in most of these questions, in which the Health Committee cannot but be interested;
>
> "And expresses the hope that, in order to avoid overlapping, the Health Organisation should be represented on the Advisory Commission which will be reconstituted in accordance with the Assembly resolution, the form and extent of such representation being fixed by the Council."

127. Close of the Session.

The PRESIDENT congratulated his colleagues on the work accomplished during the session, and thanked the various collaborators of the Committee, the experts, the Health Section and its Director, Dr. Rajchman, as also Dr. Norman White, for their assistance. He was happy to mention particularly the valuable help which had been given by his new colleagues, Dr. Alice Hamilton, Dr. Chagas and Dr. Cantacuzène; their collaboration was a good augury for the future.

Professor Léon BERNARD, speaking on behalf of his colleagues, congratulated the President upon the inestimable value of his participation in the work of the Committee.

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Annex 27.

C. H. 217.

AGENDA OF THE THIRD SESSION OF THE HEALTH COMMITTEE OF THE LEAGUE OF NATIONS

Approved by the Committee on September 29th, 1924.

1. Election of Vice-Presidents for the year 1925.
2. Medical Director's Report on the work of the Health Organisation since the Second Session of the Committee.
3. Report of the Committee of Experts on Sleeping-Sickness and Tuberculosis in Equatorial Africa.
4. Report on the progress of serological and biological investigations.
5. Report of the Commission on training in public health.
6. Action resulting from the resolutions of the Fifth Assembly of the League of Nations (September 1924).
7. Allotment of credits allowed by the Assembly for the year 1925.
8. Report of the Opium Commission.
9. Report of the Malaria Commission.
10. Report of the Commission to consider proposals regarding the Far East.
11. Report of the Commission appointed to consider action arising out of the proposal of the Dutch Government in respect of free *pratique* in ports.
12. Report of the Cancer Commission.
13. Supplementary Report to be presented to the Comité Permanent of the Office international d'hygiène publique concerning the proposed plan of activity for the year 1924-1925.
14. Miscellaneous.

Annex 28.

C. H. 241.

REPORT OF THE MEDICAL DIRECTOR ON THE WORK ACCOMPLISHED BY THE HEALTH ORGANISATION SINCE THE LAST SESSION OF THE COMMITTEE

Submitted to the Committee on September 29th, 1924.

I. — The Health Committee's Report to the President of the Permanent Committee of the Office international d'hygiène publique

1. Under the terms of its statutes, the Health Committee is required to transmit to the President of the Permanent Committee of the Office an annual report dealing with the work done during the year by the Health Organisation of the League. This report will also set out the questions with which the Health Committee proposes to deal to the extent of its competence as defined by the Council and the Assembly of the League. The 1923 Assembly expressed the wish that this report should also be submitted to the Assembly. It is easy to prepare the report on the work done during the past year before the meeting of the Assembly. On the other hand, the programme of questions upon which the Health Committee proposes to take action during 1925 cannot be fully discussed and settled before the Committee is acquainted with the decisions of the Assembly, and more especially before it knows what credits the Assembly will place at its disposal.

As the third session of the Committee was fixed for the end of September, it was not possible to submit the Committee's draft report to the plenary meeting. Your President accordingly decided that the descriptive part of the report should be prepared by the Bureau of the Committee and published with its approval. In July, I went to Brussels and London in order to settle, in conjunction with the two vice-presidents, the details of this report, which had been approved by our President. It was clear that a supplementary report, setting forth the programme of work, should be held over for discussion at the third session, and that is why the President decided toin sertas the thirteenth item in the agenda of the September session the supplementary report to the President of the Permanent Committee of the Paris Office on the plan of campaign proposed for 1925.

2. The Health Committee's report (Doc. A. 22. 1924. III; C. H. 214) gives details as to the progress accomplished up to the end of July, thus greatly simplifying my task and reducing it to explaining certain questions in greater detail.

II. — Decisions of the Council of the League

The report on the work of the second session of the Committee was submitted to the Council on June 17th by Viscount Ishii. The Council expressed its full approved of the whole of the Health Committee's report. It adopted several resolutions dealing with special questions.

The Council approved the Committee's recommendation with regard to the creation by the Health Section of the Secretariat of a Bureau for Epidemiological Intelligence at Singapore.

Moreover, in approving the view of the Health Committee that it might be advisable to consider the possibility of authorising the Permanent Committee of the Office international d'hygiène publique to act, in certain cases, as a conference for the purpose of the conclusion of conventions, or for the revision of certain conventions, the Council decided to transmit this suggestion to the French Government, which is calling the next International Health Conference. An official letter was sent to the French Government, and I think I am right in saying that the suggestion does not give rise to any objection in principle in Paris.

In addition, the Council examined in greater detail the Committee's resolution on the advisability of continuing and systematising the interchanges of public health officers, and on the application for increasing the credits to 250,000 francs. The Council expressed its agreement with the Committee and laid stress on the general importance of the system of interchanges. At the same time, it emphasised the importance it attaches to continuing the interchanges on a regular system, and it was to enable this to be done that it transmitted the Committee's request for supplementary credits to the Fifth Assembly.

The Council also had the opportunity of studying two financial questions. In the first place, the International Health Board of the Rockefeller Foundation, having decided to place the sum of 125,000 dollars at your disposal for a period of five years for the purpose of equipping and opening the Singapore Bureau, the Council decided to accept this generous offer and passed the following resolution to that effect :

> "The Council desires to thank the International Health Board of the Rockefeller Foundation for the generous contribution which it has placed at the disposal of the Health Organisation of the League, with a view to the establishment in a central port of the Far East of a Bureau of Epidemiological Intelligence. In accepting this contribution the Council authorises the Medical Director to enter into formal communication with the International Health Board and to determine, with the concurrence of the President of the Health Committee, the details of the scheme by which this new contribution may be most fruitfully utilised for the purpose already referred to."

Then, again, the International Health Board of the Rockefeller Foundation, owing to the increased cost of travelling and subsistence, offered us, for interchange, a supplementary grant of 40,000 dollars for the twelve months beginning July 1st, 1924. The Council expressed its grateful acceptance of this new credit in the following terms :

> "The Council, in accepting the increased contribution offered by the International Health Board of the Rockefeller Foundation for the interchange of public health personnel, desires to place on record its appreciation of the Board's generosity in further extending the grant available for this purpose;
>
> "It further authorises the Medical Director, in consultation with the President of the Health Committee, to utilise this additional contribution for the carrying-out of the programme of interchanges as approved by the Health Committee."

The Director-General of the League of Red Cross Societies, by a communication dated September 5th, 1924, sent to the Secretary-General of the League of Nations, for submission to the Council, a copy of a report on the sanitary situation of the Greek and Turkish populations exchanged under the Treaty of Lausanne. Since the communication from the League of Red Cross Societies raises questions of a technical character, and since the Health Committee, at the request of the Greek Government, has lately sent an investigator to enquire into the sanitary situation in that country, the Council decided to refer this question to the Health Committee. The Committee will therefore be requested to study this matter during the present session and to present any observations which may seem necessary to the Council.

III. — Decisions of the Assembly

Your report was examined by the Second Committee of the Assembly and gave rise to a debate lasting for three meetings. The report on your work was submitted by Dr Caballero, the delegate of Paraguay (Doc. A. 70. 1924. III), and is attached to my statement. You will certainly be pleased to learn that your work met with the full approval of the Governments represented at the Assembly. In accordance with the constitutional usage of the League, the Budget Committee (Fourth Committee) gives its decision on applications for credits, having regard to the report presented to the Assembly by the Committee on Technical Organisations. The Second Committee, therefore, is the one that usually investigates the question itself, leaving the Fourth Committee to determine the amount of the credits. This year the Fourth Committee also discussed very fully the merits of your work. A considerable number of delegations drew attention to the practical value of your work. Whilst the British and Indian delegations and those of the dominions displayed particular interest in the special enquiries, notably

in those dealing with cancer, malaria and the standardisation of biological products, the delegations of the Latin-American countries emphasised the immediate value of the interchanges, and this view was also very strongly upheld by the Japanese delegation and by the Polish, Swiss, Roumanian, Italian and Portuguese delegations. The Persian, Greek and Hungarian delegations drew attention to the great value of the epidemiological enquiries. The Persian delegation, acting under telegraphic instructions from its Government, thanked the Health Committee at a plenary meeting of the Assembly for sending a technical adviser to Teheran.

The Second Committee supported the Health Committee's application for supplementary credits. You will remember that the applications for credits made at the time of the Committee's first and second sessions reached the figure of 1,036,000 francs. I had the honour of submitting these estimates last May to the Supervisory Commission, whose function it is to put before the Assembly an analysis of the budget estimates of the League. The Commission did not see its way to accept your applications for credits, and reduced them to 678,000 francs, this being an increase of 31,000 francs on the total figure for 1924. Your application thus represented an advance of 358,000 francs on the figure approved by the Supervisory Commission. Without entering into detailed figures, the Second Committee of the Assembly emphasised the necessity of meeting your application generously. In these circumstances the Fourth Committee, before entering upon any discussion, asked the Supervisory Commission for a second opinion, having regard to the recommendations of the Second Committee. The Supervisory Commission only found it possible to propose the addition of 80,000 francs out of the 358,000 called for by you, the proposed increase being allocated as to 75,000 francs for interchanges and as to 5,000 for sanitary notifications in case of epidemics. This increase was accordingly submitted by the Chairman of the Supervisory Commission to the Plenary Budget Committee of the Assembly. You will be very glad to hear that the Budget Committee unanimously desired the Supervisory Commission to increase its figure. The Supervisory Commission, during the meeting of the Fourth Committee, proposed to increase the supplementary credit to 100,000 francs but this proposal was opposed by a number of delegations, which pressed for the full satisfaction of your claims. After a discussion lasting three hours, three proposals were put to the vote.

In the first place, the Italian delegation asked for an appropriation of 200,000 francs. This proposal was rejected by 16 votes to 15, after two votes by roll-call.

The second proposal, submitted by the Brazilian and Polish delegations, was that the supplementary credits should be increased to 130,000 francs. This was adopted, also on a vote by roll-call by 22 votes to 14.

Accordingly, the amended proposal of the Supervisory Commission, increasing the credits to 100,000 francs, was not put to the vote. Although this decision does not grant your full claim, it yet expresses entire and unanimous approval of your activities.

In the Second Committee, two delegations made suggestions to the Health Committee for extending the scope of your work. The Paraguayan Delegation asked you to enquire in due course into the question of physical education and to investigate the means for its general extension on rational principles. The Delegation of the Kingdom of the Serbs, Croats and Slovenes asked you to institute an enquiry into the value of preventive measures against tuberculosis, and submitted with this object a wider proposal, which is annexed hereto.

Finally the following resolutions were adopted by the Assembly.

> "The Assembly, after examining the report of the Health Committee on the work accomplished by the Health Organisation between the Fourth and Fifth Assemblies, notes with satisfaction that the Health Committee has been definitely constituted in accordance with the scheme approved by the Fourth Assembly.
>
> "The Assembly considers that the work accomplished by the Health Organisation is in conformity with the duties entrusted to it by Article 23 (*f*) of the Covenant, and that it is instrumental in promoting valuable international co-operation in health matters.
>
> "The Assembly approves the work of the Service of Epidemiological Intelligence and Public Health Statistics and the results obtained from the carrying-out of the system of interchanges of public health personnel. The Assembly notes with pleasure the results obtained through the efforts of the Committee in connection with the standardisation of sera and biological products. It considers that the most valuable results may be anticipated from the enquiry which has been undertaken into mortality from cancer, and that the work of the Malaria Commission is calculated to furnish valuable assistance to the administrations most vitally concerned. The Assembly is gratified to note that the Health Committee has responded to the requests of several Governments by placing at their disposal investigators and technical advisers on matters of public health. It approves the establishment of a Bureau of Epidemiological Intelligence in the Far East.
>
> "The Assembly requests the Health Organisation to take into consideration in due course the study of the problem of physical education and to investigate the means for its general extension on rational principles. It further requests the Committee to undertake an enquiry as to the value of preventive measures against tuberculosis, taking into account the proposition presented by the Government of the Kingdom of the Serbs, Croats and Slovenes.
>
> "The Assembly asks the Council to suggest to the Health Committee the desirability of communicating to the Permanent Committee of the Paris Office international d'hygiene publique the report setting out the questions with which the Health Committee proposes to deal (which is referred to in Article 4 of the *Règlement intérieur*) at such a date as to permit the Committee to make, before the next Assembly, any observations to the Health Committee which appear to it desirable."

Paragraph 5 of this resolution, concerning the relations between the Health Committee and the Permanent Committee of the Paris Office was the subject of protracted discussion and a variety of comments.

This paragraph was proposed by the delegation of India and supported by the delegations of Great Britain and the Dominions.

Its effect was to raise the whole question of the interpretation of the Paris arrangement drawn up by last year's Mixed Committee, and the concern displayed by several delegations as to this question was expressed in an interpretive declaration made at the Assembly by the Italian delegation and supported by the delegations of Poland and Venezuela. This declaration is as follows :

> "The Italian delegation accepts the modification put forward by the Rapporteur. It also accepts the resolution in its entirety declaring that it interprets the resolution in the following sense :
>
> "That the report referred to shall specify the particular questions on which it would be desirable for the permanent Committee of the Office international d'hygiène publique in Paris to make, before the next Assembly, any observations to the Health Committee which may seem to it desirable."

The Health Committee will not be officially informed of this question until it receives a communication from the Council in accordance with the terms of the resolution.

IV. — Interchanges of Public Health Personnel

The programme of interchanges for the current year has just been completed by the inter change which took place in Switzerland from August 10th to September 17th.

The final conference took place at Berne, it being impossible to hold it at the Secretariat during the Assembly.

Advantage was taken of the visit of the participants to Geneva at the end of August to deliver a series of lectures on the work of the League of Nations in general and of the Health Organisation in particular.

An analysis of the results obtained during 1924 indicates the necessity of a careful choice of participants in the interchanges. The members of the Committee will remember that, at their request, I addressed a circular letter to the chiefs of all health administrations asking for a list of medical officers of health and sanitary personnel occupying important positions in the central sanitary administrations, as well as a list of candidates for the interchanges during 1925 (and, if possible, for 1926 also). A considerable number of detailed replies has already been received, and I hope that by October 15th a list of candidates will be complete, except for the Latin-American countries, to which we are devoting special attention. It will, I think, be necessary in future to pay more attention to the knowledge of foreign languages possessed by the candidates. An effort should also be made to form groups which would be more harmonious from the point of view of technical experience and general training. I should like to call attention to an interesting proposal made by the health administration of a central European country that a special interchange should be organised for directors of health administrations or their principal assistants.

I hope also that it will be possible for us in the future to send to all the participants the documents prepared by the health administrations of the countries to be visited at least two months before the beginning of the interchange. This is a point of special importance. The documents also might advantageously be divided into two types of publication : on the one hand a general statement on the constitution and legislation of the country, the working of its health service and an outline of the most important problems with which the local sanitary administrations are faced; on the other hand it seems to us advisable to supplement this statement by a collection of the laws which are in force, statistical year-books, and all the other official publications containing the exact data from which the general statement has been compiled.

At the beginning of the interchange — that is, during the period devoted to lectures (as well as during the course of the interchange where special lectures are given) — it is very desirable that the text of these lectures should be given to the participants, although it would be preferable, without doubt, that they should not be published in definite form before the interchange has taken place, since the lecturers may be led to complete the text of their lectures as a result of discussion with the members of the interchange. I therefore propose asking the organisers of the interchanges in the various countries to supply us with the multigraphed text of the lectures for provisional distribution to the participants.

The first general interchange for 1925 will take place in Great Britain in February or March; the date will be definitely fixed in a few weeks' time. The organisers in Great Britain suggest to us that the duration of the interchange should be reduced by one week, leaving the length of the interchange at the usual figure of seven weeks. One week would be given at the beginning to general lectures in London, thereafter five weeks to visits by groups of three or four members to certain carefully chosen districts, and finally the participants will be allowed one week to assemble the information they have gathered to ask for further information, and to prepare their remarks for a final conference which will be held in London.

The admirable manner in which the British interchanges have been carried out during the last two years makes it certain that the 1925 interchange will be fully as profitable as those which have preceded it for the numerous medical officers who present themselves as candidates for this particular interchange.

The second interchange, in Belgium, will begin in the month of May, and M. Velghe proposes that after the first week of general lectures 21 days should be devoted to visiting the most

characteristic health institutions and services of the country. These visits will be followed by 15 days spent in particular localities by groups of four members. These groups will finally meet for six days in Brussels at the end of their stay in Belgium for technical discussions.

M. Velghe has already made all the preliminary arrangements for this interchange, and there is no doubt that it will furnish a model for the health administrations of countries whose comparatively limited area permits the study of the characteristic traits of the entire health service.

The interchange in the Kingdom of the Serbs, Croats and Slovenes will probably begin in May or June. The first week will be spent at the Central Administration in Belgrade. Thereafter the participants will be divided into three groups of six, which will in turn spend two weeks in three different provinces with the aim of allowing the members to study the varied sanitary conditions and the different social aspects of the country. During the last week they will meet at Zagreb for technical discussions and lectures which will be followed, as in the first two interchanges, by a final conference in Geneva.

The health administration of the Kingdom of the Serbs, Croats and Slovenes has very generously offered to meet the travelling expenses and the subsistence allowance of all the participants during the whole of the interchange. The members of the interchange will therefore be the guests of the Government during their stay in the Kingdom of the Serbs, Croats and Slovenes.

The Japanese Government is making arrangements for the organisation of an interchange to begin at Tokio in September or October 1925. The Far Eastern Association of Tropical Medicine will at the same time be meeting in the Japanese capital.

I shall have pleasure in communicating to the Committee at a later date the detailed programme of this interchange, which will be limited to officers from the health services of the Far East and in which a member of the Health Committee may perhaps wish to take part.

The great interest displayed by the Governments and health services of Latin America in the system of interchanges and the practical difficulties in the way of Latin American participation in interchanges held in Europe make it incumbent on the Health Committee to give close attention to the question of interchanges in relation to Latin America. Experience has, in fact, shown that public health officers of these countries do not derive, perhaps, from a short sojourn in Europe all the advantage that is desirable from the point of view of their own health administrations and of the Health Organisation of the League of Nations.

It will probably be more satisfactory from every point of view to form a group of ten or twelve public health medical officers from these countries and to offer them full facilities for studying the work of the Health Services of the United States, Canada, England and two or three other well-chosen countries of the European Continent. An interchange of this character, lasting four or five months, would enable these health officials to familiarise themselves with the various technical methods that are applied in solving sanitary problems similar to those with which they themselves are confronted, and with the manner in which those problems present themselves in the various countries. This method would help in producing specialists possessing a particularly wide and practical experience, and the Health Committee might well expect from such a picked body, when once constituted, a fruitful and continuous collaboration extending over all the Latin-American countries.

The interchange budget for 1925 will be examined and drawn up in a way that will permit the carrying-out of this plan, which, owing to the generous offer of the Serb-Croat-Slovene Government, whereby our budget is relieved of a great part of the expenses necessary for the interchange in the Kingdom of the Serbs, Croats and Slovenes, may be carried out in its entirety.

The organisation of the interchange for specialists, reserved for factory inspectors, will be set out in detail by Dr. Carozzi. We propose to include only ten medical officers. For reasons which will be indicated by Dr. Carozzi, they will begin their studies at Geneva, with three weeks of special lectures organised by the Industrial Hygiene Section of the International Labour Office. This period of lectures will be followed by visits and detailed studies in England, Belgium and the Netherlands.

The organisation of the interchange for public health officers who are specialised in protection of maternity and in child welfare will be greatly facilitated by the recent creation of an Advisory Commission on Child Welfare under the auspices of the League of Nations. It would perhaps be preferable to obtain the collaboration of this Commission in preparing the plan of this interchange, which promises to be of the greatest interest. The question of it taking place during 1925 will, however, be subject to financial considerations.

In this connection the Committee will remember that the special grant of the Rockefeller Foundation comes to an end on October 1st, 1925, and that for this reason the ordinary and special grant of the International Health Board will not, during 1925, reach the figures for the current year. Although the Assembly has trebled its contribution, raising this year's figure of 50,000 Swiss francs to 150,000 for 1925, the total funds available will be 30,000 francs less than the amount spent during 1924. Negotiations which were entered into with the Rockefeller Foundation as soon as the vote of the Budget Committee of the Assembly was passed allow me to hope that the International Health Board will continue its invaluable aid to the Health Organisation after October 1st, 1925, more especially in view of the material proofs that have been afforded of the interest attached by the Governments to the continuation of the system of interchanges

V. — Epidemiological Intelligence Service

A few details only need be added to the relevant chapter of your Report to the President of the Permanent Committee of the Office international d'hygiène publique (Doc. A. 22. 1924. III). These questions are treated in a memorandum annexed to the present document, which gives the Committee an idea of the actual stage of the systematic and methodical studies undertaken

at your request on lines laid down last February with a view to the scientific utilisation of official statistical data as it is periodically published in the monthly and annual reports of the Health Section.

A new phase in the working of the Service of Epidemiological Intelligence and Public Health Statistics is reached as a result of the establishment of the Singapore branch office, which we hope will be able to ensure in the near future the rapid transmission of information relating to plague and cholera, as well as to any other epidemic disease susceptible of rapid propagation by sea-traffic. This epidemiological branch office will also be charged with the duty of collecting, in a systematic manner, all data and information concerning Far Eastern countries in a way similar to that used in Geneva for preparing the monthly *Epidemiological Report.*

This service, organised in November 1921, devoted itself during the first years of its existence, according to the plan of the Health Committee, to the study of sanitary conditions in Eastern Europe. As a result of continuous and fruitful work during 1923, we have been able to assure for the future the regular supply of epidemiological information from the greater part of civilised countries. Moreover, through the regular publication of the reports during 1924, it has been possible to give each month a comparatively complete epidemiological survey with occasional observations on the epidemic situation as regards notifiable diseases in the various countries. The Committee may perhaps decide, in 1925, to consider the possibility of stabilising the progress that has already been made by advocating the conclusions between certain health administrations of sanitary agreements for the notification of specified diseases. The memorandum of the Epidemiological Intelligence Service contains proposals for the formation of a world registration area for notifiable diseases—an area which might be based on the principles underlying the births and deaths registration area formed in the United States.

The characteristic feature of the Service of Epidemiological Intelligence is the fact that we have succeeded in securing a regular service of official information through the voluntary efforts of the various health administrations. In the same spirit a voluntary registration area for notifiable diseases has already been constituted. It is perhaps necessary to examine the best conditions under which notification may in future be made, and whether, by the voluntary and general adoption of a few leading principles, real progress might not be effected with regard to the notification of infectious diseases.

VI. — The Work of Serological and Biological Standardisation

1. Agreement was reached last year on the question of diphtheritic anti-toxin, and the same result will probably be reached during the present year as regards tetanus. The Conference on Dysentery Serum has just resulted in an agreement by which the preparation and distribution of the international standard serum is entrusted to the Danish Serotherapic Institute; thus a large part of the plan drawn up in December 1921 has been put into effect.

The researches on the sero-diagnosis of syphilis are to be further carried on during 1925. I beg to recall in this connection that, according to the instructions given by the Committee in February last, I have brought under the notice of all health administrations the results of the Copenhagen Conference with regard to free treatment and the special conditions under which sero-diagnosis should be carried out. I have forwarded to the members of the Committee an analysis of the replies received from the different health services in this connection.

2. In accordance with the Committee's decisions, I have taken steps to collect information relating to the control of biological products, and more particularly insulin, in the various countries. I had hoped to be able to present at this session a complete analysis of this information, but I fear that a period of three months will be necessary for the checking and completion of the valuable data so far collected.

The Committee will perhaps desire to examine an invitation addressed to the Secretary-General for the representation of the Health Organisation at the International Conference for the Unification of Heroic Remedies. This Conference will take place at Brussels on the invitation of the Belgian Government, which, in this respect, is responding to a request from the International Pharmaceutical Federation of The Hague. The Federation asked the Belgian Government to take the initiative in convoking a conference composed of official delegates from the various Governments with a view to studying the question of creating a bureau for an international pharmacopœia. The task of this Conference will be to express its opinion as to the creation at Brussels of a permanent bureau for an international pharmacopœia, the costs of maintenance being divided between the signatory Powers in the proportion laid down by the International Postal Union.

VII. — Report of the Committee of Experts on Tropical Diseases

The Committee of Experts, after studying all the information which it has been able to secure concerning the actual incidence of tuberculosis and sleeping-sickness in Equatorial Africa, has decided to present a series of recommendations to the Health Committee. These recommendations relate, on the one hand, to the administrative measures, including special arrangements which might be adopted or concluded by the administrations of countries in Equatorial Africa, and, on the other hand, to the programme of work for the solving of important problems in the epidemiology of sleeping-sickness which still call for explanation. The recommendations contemplated the despatch of one or more experts to selected localities with a view to allowing

comparisons to be made by the same investigators between conditions prevailing in the different parts of Africa.

The Committee will perhaps wish to entrust the study of these very important recommendations to a special sub-committee.

VIII. — Requests to the Health Committee for Technical Advice

1. Dr. Gilmour, who was sent to Persia at the request of the Persian Government, returned from Teheran last week. I have already forwarded his preliminary report to the members of the Committee, and I hope that the Committee will find time to hear a detailed statement which Dr. Gilmour has prepared for its consideration.

2. The reports sent by Dr. Haigh, who is still in Albania, has been passed to the Malaria Commission for preliminary examination.

3. The same applies to the reports of Dr. Norman White on the enquiry he undertook at the request of the Greek Government. This report has also been communicated to all the members of the Committee.

4. The Director of the League of Red Cross Societies has requested that the Council should be seized of a memorandum on the sanitary conditions of the population exchanged between Greece and Turkey as a result of the Treaty of Lausanne. This memorandum contains proposals for international action in the matter of sanitary assistance. The Council has decided to ask the Health Committee for a technical opinion in this connection, and the documents have been passed for preliminary examination to the Malaria Commission.

IX. — Commissions and Sub-Committees of the Health Committee

1. The Malaria Commission met last week and will present its report at the meeting on Wednesday, October 1st. This report will contain proposals resulting from the collective study tour carried out this year. There will also be a programme of work for 1925 and an opinion with regard to the Greek proposal and the letter from the League of Red Cross Societies.

2. The Cancer Commission met last week and will present a progress report on Thursday, October 2nd.

3. The Waterways Commission has had two meetings and will hold a joint meeting with representatives of the Transit Committee on Monday, September 29th. The final report will be presented on Friday, October 3rd, or Saturday, October 4th.

4. The Commission on Public Health Training held four meetings last week and will present a general report on Monday, September 29th.

5. The Opium Commission has had one meeting and will present its final report on Tuesday, September 30th.

6 The Temporary Mixed Commission of the Industrial Hygiene Section of the Internationa Labour Office and the Health Committee, which is examining the question of anthrax, has had two meetings, and its report will be presented by Dr. Carozzi on Friday or Saturday, October 3rd or 4th.

7. The Sub-Committee on Far Eastern Problems has met and will present its report on Friday, October 3rd.

8. The same applies to the Commission which is studying the Dutch proposal concerning *libre pratique*.

X. — Proposals for New Investigations

1. I have already had the honour to refer to the Assembly resolution regarding the study of tuberculosis. I have also communicated to the members of the Committee the proposals tending in the same direction which are being presented by Professor Tsurumi.

I should like to call the attention of the members of the Committee to the fact that Professor Calmette is desirous of transmitting, through the intermediary of the Health Committee, his anti-tuberculous vaccine to such institutes in Central and Eastern Europe as make the necessary requests and are in a position to carry out the appropriate experiments and observations.

The Committee might perhaps entrust the study of these three proposals to a sub-committee which would be able to present its recommendations during the present session.

2. I beg to recall the resolution of the Assembly as to the utility of a study of the problem of physical education (Doc. A. 89. 1924. III).

3. I communicate to the members of the Committee a resolution of the Assembly taken on September 26th, 1924 in the following terms :

> "The Assembly recommends in addition that the Health Organisation of the League should be invited to consider any measures within its competence which it would be desirable and practicable to undertake for the protection of children from the hygienic point of view."

The Committee will find annexed the other resolutions of the Assembly regarding the protection of children (Doc. A. 127. 1924. IV).

I beg to recall in this connection the Committee's decisions regarding the organisation of an interchange for specialists in child welfare.

Appendix.

PROPOSITION OF THE GOVERNMENT OF THE KINGDOM OF THE SERBS, CROATS AND SLOVENES, PRESENTED TO THE FIFTH ASSEMBLY

The Government of the Kingdom of the Serbs, Croats and Slovenes has the honour to address a request to the Health Committee of the League of Nations regarding a question of public health in connection with which the Health Organisation of the League might afford it technical collaboration.

The Government of the Kingdom of the Serbs, Croats and Slovenes wishes to obtain all possible information with regard to the most effective modern methods of combating tuberculosis.

From the point of view of the Serb-Croat-Slovene Government, this request is particularly relevant at the present moment, as it has embarked upon the construction and reconstruction of certain regions and desires that the work should proceed along the most suitable lines from the point of view of public health. By means of comparative enquiries and studies, the Health Organisation of the League of Nations might perhaps be able to collect useful data summarising the experience of other countries in their campaign against tuberculosis, with due regard to the mistakes made, as well as to the success that has been obtained.

The Government of the Kingdom of the Serbs, Croats and Slovenes would be grateful if consideration could be given to this request and the desired action taken; it is convinced that such an enquiry would give all the health administrations an opportunity to compare their methods and the results that they are obtaining, and might enable them to agree upon some international doctrine for a rational campaign against tuberculosis.

Annex 28 a.

C. H. 241.

WORK OF THE EPIDEMIOLOGICAL INTELLIGENCE SERVICE

Memorandum by Dr. Eichel, submitted to the Committee on September 29th, 1924.

I. — WORK OF THE COMPARABILITY GROUPS

There were organised last spring four groups of experts who agreed to study for the Health Section the following problems in vital statistics :

Joint Causes of Death;
Standard Million Population;
Age and Sex Classification;
Still-Births.

These problems in the comparability of international vital statistics have given much concern and difficulty to both medical statisticians and health officers for many years, but previously no systematic efforts towards their solution had been undertaken. The present membership of these groups is as follows :

Joint Causes of Death.	Dr. T. H. C. STEVENSON, England. Dr. W. H. DAVIS, U.S.A. Dr. S. ROSENFELD, Austria. Dr. E. ROESLE, Germany.
Standard Million Population.	Professor A. NICEFORO, Italy. Professor E. WURZBURGER, Germany. Professor Edwin B. WILSON, U.S.A. Dr. J. BROWNLEE, England.
Age and Sex Classification.	Dr. H. J. HANSEN, Denmark. Mr. R. H. COATS, Canada. Professor R. PEARL, U.S.A. Comm. A. ASCHIERI, Italy.
Still-Births	Drs. R. DUDFIELD and Eardley HOLLAND, England M. HUBER, France. Dr. M. NEY, Switzerland. Professor G. HEDRÉN, Sweden.

As each expert accepted membership there was mailed to him a memorandum which had been prepared by the Health Section on the subject in question. These consisted of the following :

C. H. 165. "A Preliminary Statement on the Uniformity of Statistical Tables on Causes of Death with respect to Age and Sex".

C. H. 167. "A Preliminary Report on the Lack of Uniformity in the Definition of Still-Birth".

C. H. 168. "A Preliminary Report on the Comparability of Data on the Causes of Death in Different Countries".

Each memorandum was prepared under date of February 8th, 1924, and set forth the chief factors requiring study in consideration of these problems. For example, C. H. 165 described concisely the age and sex classifications of the published mortality statistics in the standard annual and other reports of a number of countries. C. H. 167 contained a statement as to the necessity for uniformity in the definition of still-births, with brief statements of the definitions in use in a number of countries and the existing differences. C. H. 168 comprises an elaborate statement of the special points of difference in procedure for the certification of causes of death and their classification, with an account of some of the important factors involved. This memorandum also contains special references to the procedure followed in a number of different countries.

To the experts on the group for the standard million question there was circulated a memorandum on the subject which had been prepared for the Health Section by Professor Alfredo Niceforo and which sets forth his views on the subject and describes various phases of the problem, with suggestions for further investigation. The experts on this subject were also furnished with a special report—No.60 of the Medical Research Council of England—which was a report by Dr. J. Brownlee (himself a member of the Standard Million Group) entitled "The Use of Death-Rates as a Measure of Hygienic Conditions", in which he discusses the standard million problem and states his views.

The members of the group on the problem of still-birth were supplied with a special report of the Ministry of Health of England, by Dr. Earley Holland, on the "Causation of Foetal Death".

When these documents were circulated they were accompanied by letters inviting comments upon them and suggestions for further steps in these proposed studies.

In these transactions the Chief of the Epidemiological Intelligence Section has acted thus far as secretary to each group.

In response to these letters conveying the documents mentioned, there have been received to date a number of letters and memoranda from the various experts, among which have been the following :

Statement from M. Huber, Chief of the Central Statistical Office of France, on the subject of still-birth, presenting his observations on the need for uniform definition and elaborating many technical points for consideration. He also discusses the distinctions made in various countries and offers recommendations for further study, including his own views at to the elements of a standard definition.

Statement from Dr. Dudfield on still-birth, similar in character to M. Huber's. (In an informal conference in London with Drs. E. Holland and Dudfield, the Chief of the Epidemiological Intelligence Service obtained personal statements of their views and discussed these.)

Memorandum from Dr. H. C. Stevenson, setting forth his views on the subject of classifying joint causes of death, in which he submits a very important suggestion to the general effect that causes of death should be accepted as primary or contributory according to the indication of the certifying physician when he registers the death.

Letter from Dr. Rosenfeld, and later a lengthy memorandum, enclosing a draft of a questionnaire which he suggests should be sent to various statistical offices requesting detailed information on methods of certifying causes of death, and suggests, in addition, two preparatory studies which he believes the group should undertake to make the enquiry thorough and useful. The first study he suggests concerns the use of the questionnaire, and the second, which is more technical, relates to the inter-relation between different causes of death.

Memorandum from Dr. T. E. Roesle, of Berlin, discussing the general problem of joint causes and likewise submitting a draft of a questionnaire to be sent to various offices for detailed information on their practice in classification.

Memorandum from Dr. M. Ney, of Switzerland, containing his observations on the various factors involved in the definition and classification of joint causes of death.

Two letters from Professor E. Wilson, of Harvard, stating his views on the matter of a standard million population, in which he makes a distinction between a standard population and a stationary population, and states for consideration and study the following question : "Biologically it is the stationary population that has significance to a far greater extent than the standard population".

As these various memoranda and letters have been received by the Chief of the Epidemiological Intelligence Service they have been sent by him to the other members of the group concerned for their further comment. In addition, he has conferred in London with Dr. Stevenson on joint causes of death and with Dr. Brownlee on the standard million population; in Geneva with Professor Wurzburger on the standard million population; in Rome with Professor A. Niceforo on the same subject, and with Commander Aschieri on the work of the groups on age and sex and joint causes. He has also conferred with Dr. H. J. Hanson regarding modifications of the international list of causes of death, which is related to the subject of joint causes and age and sex.

Further memoranda and letters have recently been received from members of the groups, which will shortly be circulated to the appropriate groups; for example :

Three important memoranda from Sir George Knibbs, of Australia, on the problems of all the groups. (Professor Knibbs has been invited to serve as a corresponding member of these groups on the various questions under investigation.)

A detailed statement from Mr. R. H. Coats, Dominion Statistician of Canada, with respect to age and sex classification.

A lengthy statement from Professor Würzburger regarding comparability of causes of death, in which he discusses in detail some of the important factors involved, especially with regard to age and sex classification.

A communication from Commander Aschieri concerning the important questions which, in his judgment, require study with respect to standardising age and sex classification.

Memorandum from Professor C. Hedren, of Stockholm, stating his views as to the definition of still-birth.

A further communication from Professor A. Niceforo on the problem of the standard million.

A long memorandum from Dr. Rosenfeld on the comparability of causes of death in different countries, containing comments on Document C. H. 168.

Several letters from Dr. Davis, Chief Statistician on Vital Statistics for the United States, regarding the problem of joint causes of death.

II. — Special Reports

Professor Seligmann, of Berlin, was invited to study the question of the extent to which cases notified as cerebro-spinal meningitis can be identified as infection with the meningococcus organism in Berlin and Prussia, and to gather such information as would be pertinent with regard to the epidemiology of the disease. A preliminary report which he has submitted contains some of the results of an enquiry from 45 out of 47 institutions circularised. Out of 3,714 bacteriologic tests made, of which 3,134 were of specimens obtained by lumbar puncture, 547 by throat swabs and 33 of blood samples, there were found positive for the meningococcus 491, distributed as follows :

As to specimens :

Lumbar	403
Throat	69
Serum	17
Blood	2

The pneumococcus, streptococcus, staphylococcus, influenza bacillus, tubercle bacillus and a few other organisms were found in the various specimens; 2,159 specimens were sterile. This leads Professor Seligmann to the conclusion that meningococcus meningitis was not very prevalent in Prussia during 1923, the year in which the cases under review occurred.

His investigation of the disease in Berlin showed that apparently 47 out of 59 cases of the disease were correctly reported as meningococcus meningitis. He found no definite correlation with density of population or wealth. He submits some preliminary comments on the reporting of the disease for the first half of 1924 in Berlin and promises a more detailed report for the whole of Prussia during 1923.

Dr. Rosenfeld, of Vienna, was invited to prepare a survey of tuberculosis statistics with regard especially to their comparability as affected by methods of registration, classification and grouping by type and organs. His preliminary report submits tuberculosis mortality rates for all countries to indicate the prevalence of the disease, and shows that about one million deaths occur annually from this cause in Europe. The mortality is low in some tropical countries, and the decline in several countries has been very rapid in recent years. He states that the mortality data are affected as to their comparability by the various factors already described in the Health Organisation Document C. H. 168. He classifies several errors affecting the data — namely, those dependent upon norms for the basis of the figures, medical technique and diagnosis, and tabulation methods — and presents some discussion of the nature of these factors. He further points out the progressive development of tuberculosis statistics in several countries and indicates again the resulting effect on their comparability owing to the differing stages of this evolution. He further points out the differing rules followed in the classification and statistical grouping of types of the disease.

III. — Proposition as to World Registration Area for Notifiable Diseases

The success and further progress of the Service of Epidemiological Intelligence, if viewed critically, would seem to depend not only upon its own initiative but equally also upon the effectiveness of the assistance it receives from national health services and vital statisticians. In other words, it must depend upon the closeness of the co-ordination of their work among themselves and with that of the Health Section in Geneva. This in itself, therefore, presents a unique problem in organisation, which has led to a preliminary study of the feasibility of creating a world-registration area for vital statistics — an area similar in character and purpose to those in the United States for births and deaths. In that country, registration of vital statistics is solely the function of each individual State; the Federal Government exercises absolutely no jurisdiction or supervision. Therefore, in order to secure accuracy, completeness, uniformity and consistancy of the statistics for the entire country, there were established some years ago two areas — one

for births and one for deaths — to which no State could be admitted unless it enforced and maintained certain standards. This step on the part of the Federal Government was undertaken solely through informal action on its part and with the co-operation of the individual States. Experience proved its value as an effective means for accomplishing its purpose.

The creation of a similar world area for births and deaths has been found, upon careful study, to be complicated by many difficulties, for the solution of which at present no satisfactory method can be proposed. But inasmuch as the Health Section is more immediately concerned in the first instance with the notification and control of communicable diseases, the creation of an area for notification alone has been studied, and it is believed a practicable basis can be found.

At once, however, a number of questions arise as to procedures necessary for its establishment and subsequent development, should the general plan meet with approval. Viewed broadly, such an area may be regarded as already existing, if those countries are taken together which furnish periodically and regularly to the Health Section complete statistics on a group of important communicable diseases. Therefore, if the minimum conditions with which they in general already comply are given precise definition, and if these can be supplemented with exact procedures for the inclusion of the various countries, the basis for an area will have been found. Hence, for the purpose of discussion, the questions for solution may be specified as follows, in their logical sequence :

(1) What preliminary steps may be desirable to acquaint the different countries with the proposed plan and to secure their voluntary co-operation in making it successful?

(2) Should the standards for admission be so defined as to include many countries on a minimum basis or a few on a maximum? In other words, what modification may be desirable of the following requirements :

(*a*) Each country shall be included as a unit unless it comprises two or more large areas which are entirely autonomous in the notification of communicable diseases (*e.g.* Germany, Russia, United States, etc.).

(*b*) The following diseases shall be notifiable by statutory provision or administrative regulation in each unit :

Plague	Typhoid fever
Asiatic cholera	Scarlet fever
Yellow fever	Diphtheria
Smallpox	Dysentery
Typhus fever	Epidemic cerebro-spinal meningitis

(*c*) There shall be satisfactory evidence that the above diseases are actually notified within limitations to be defined. These limitations might be prescribed by a small committee of experts on registration of vital statistics and on clinical medicine. There are only three methods of testing the completeness of disease notification — namely :

(*i*) by an actual census;
(*ii*) by a census which will provide random samples;
(*iii*) by checking registered deaths against notified cases.

Modifications of these methods will readily suggest themselves, and only the third method is really practicable for large areas. Again, various methods of checking deaths against cases are possible (*e.g.* comparison of death certificates with notifiable disease records, or checking of hospital records). Hence, a committee of experts might advisedly consider defining certain standards for each of the diseases named by which to test the completeness of notification. This might conceivably be done on the basis of calculating the probable number of existing cases on the basis of hospital experience and medical opinion as to the case fatality. This would not be invariably, or perhaps commonly, an absolute test, but it might furnish a basis of minimum standards for each disease. These standards would of necessity be variable for different years or periods, as may be determined by a permanent committee on this subject, to provide for variations in the virulence of each infection, especially during periods of epidemicity. As a concrete example, if it were generally agreed by physicians, or shown by hospital records, that the annual case fatality of typhoid fever varied between 10 and 20 per cent in a given area, then the number of registered deaths from this disease should not comprise less than 10 per cent of the actual number of cases notified.

It would seem to be a feasible plan for a registration area to operate under standards prescribed by a permanent committee of experts, by which the Health Organisation would be guided in maintaining the registration area.

(*d*) Each unit shall publish statistics on the above notifiable diseases at periods not less frequent than monthly.

If a world registration area for notifiable diseases is created, the question must subsequently be considered as to the admission of new units which may be ineligible in the beginning and the exclusion of others unable to maintain the required standards. From time to time, possibly annually, the standards for admission might advisedly be raised to provide an incentive for States already included to continue their progress and for others to improve their work to be acceptable for admission.

As an alternative to the above plan, certain arbitrary standards could be defined, which might be regarded as adequate under present conditions. The Health Section

would publish monthly and annually systematic combined data for such countries as already maintain these standards. These countries would, then, entirely in a technical sense, be designated as a "world registration area", this defined as a matter of scientific convenience for the presentation of statistics characterised by certain qualities of precision, completeness, uniformity etc. If this plan should be approved, it might conceivably lead in practice to a more elaborate scheme of standards later. In any event it should aid in accomplishing the ultimate purpose in view — namely, to furnish strong encouragement for all countries to continue a progressive development and use of notification as an instrument for the control of communicable diseases.

Annex 29.

A. 127. 1924. IV.

PROTECTION OF CHILDREN

Resolutions adopted by the Assembly on September 26th, 1924.

I

1. The Assembly ratifies the decision adopted by the Council at its session in March 1924 providing that the work hitherto carried out by the International Association for the Protection of Children should henceforth be entrusted to the Secretariat of the League of Nations.

2. The Assembly requests the Council to reconstitute the Advisory Committee on the Traffic in Women and Children under a new name and with two groups of assessors, one group to attend whenever questions relating to the traffic in women and children are dealt with and the other when questions relating to the protection of children are discussed.

The Assembly recommends that the assessors belonging to the latter category should include persons qualified to act as representatives of the principal private organisations dealing with the protection of children, and, in particular, the International Association for the Protection of Children.

3. The Assembly considers that the subjects to be dealt with and the methods of dealing with them should be such as may be approved by the Council on the advice of the Advisory Committee; and considers that in this matter the League can most usefully concern itself with the study of those problems on which the comparison of the methods and experiences of different countries, consultation and interchange of views between the officials and experts of different countries and international co-operation may be likely to assist the Governments in dealing with such problems.

4. The Assembly takes note of the fact that the protection of children in certain respects already falls within the scope of the work of existing organisations of the League; for example, protection, from the hygienic point of view, falls within the sphere of the Health Organisation of the League, and the regulation of the conditions of employment of children within that of the International Labour Organisation; and considers that, in carrying out any new duties entrusted to the League, care should be taken to prevent any duplication of work.

5. The Assembly recommends in addition that the Health Organisation of the League should be invited to consider any measures within its competence which it would be desirable and practicable to undertake for the protection of children from the hygienic point of view.

6. The Assembly, considering that the international work proposed is of great permanent, social, scientific and juridical value, regrets that for general budgetary reasons the supplementary funds asked for are not available for 1925. It requests the Council to invite the Advisory Committee, when reconstituted, to present, in its report to the Council and the Sixth Assembly, an estimate of the appropriations necessary for the adequate prosecution of its future undertakings.

II

The Assembly endorses the declaration of the rights of the child, commonly known as the Declaration of Geneva, and invites the States Members of the League to be guided by its principles in the work of child welfare.

Declaration of Geneva.

"By the present Declaration of the Rights of the Child, commonly known as the Declaration of Geneva, men and women of all nations, recognising that mankind owes

to the child the best that it has to give, declare and accept it as their duty that, beyond and above all considerations of race, nationality or creed :

"I. The child must be given the means requisite for its normal development, both materially and spiritually;

"II. The child that is hungry must be fed; the child that is sick must be helped; the child that is backward must be helped; the delinquent child must be reclaimed; and the orphan and the waif must be sheltered and succoured;

"III. The child must be the first to receive relief in times of distress;

"IV. The child must be put in a position to earn a livelihood and must be protected against every form of exploitation;

"V. The child must be brought up in the consciousness that its talents must be devoted to the service of its fellow men."

Annex 30.

C. H. 249.

INTERNATIONAL CONFERENCE FOR THE UNIFICATION OF POTENT DRUGS

Letter to the Secretary-General of the League from the Belgian Minister for Foreign Affairs, submitted to the Committee on September 29th, 1924.

Brussels, August 6th, 1924.

The International Pharmaceutical Federation, which met at The Hague, expressed a desire that the Belgian Government should take steps to summon a conference of official delegates of the various Powers with a view to considering the question of the creation of an International Pharmacopœia Secretariat.

In pursuance of this recommendation, the Minister of the Interior and of Health has decided to summon an international conference at Brussels in 1925 for the unification of potent drugs. This conference will, in particular, be asked to take a decision in regard to the creation at Brussels of a Permanent International Pharmacopœia Secretariat. The expenses of installing this Secretariat will be borne by the Powers acceding to the plan in accordance with the apportionment of the expenses of the International Bureau of the Universal Postal Union.

At the request of my colleague, I have the honour to invite the Secretariat of the League of Nations to be represented at this conference.

Annexed to this letter is a list of the questions which it is proposed to consider at the conference.

I shall inform you in due course of the exact date on which the conference will meet.

On behalf of the Minister for Foreign Affairs :

(*Signed*) MASSON,
Minister of Justice,

LIST OF QUESTIONS TO BE SUBMITTED TO THE SECOND INTERNATIONAL CONFERENCE FOR THE UNIFICATION OF THE FORMULA OF POTENT DRUGS

1. Revision of the decisions adopted by the First Conference.
2. Unification of the formula of other potent drugs.
3. Unification of arsenical and bismuth drugs.
4. Advisability of unifying the methods of chemical dosage of certain drugs.
5. Desirability of introducing and unifying the methods of biological dosage.
6. Unification of maximum doses.
7. Consideration of the advisability of adopting a special type of phial in the sale of drugs so as to enable drugs intended for external application to be distinguished from those intended to be taken internally.
8. International regulation of the traffic in drugs.
9. Consideration of a scheme for the creation of a Permanent International Pharmacopœia Secretariat.

Annex 31.

C. H. 242.

PROBLEMS CONNECTED WITH THE PROPHYLAXIS OF TUBERCULOSIS

Letter from Professor Léon Bernard, Secretary-General of the International Union for Combating Tuberculosis, to the Secretary-General of the League of Nations, submitted to the Committee on September 30th, 1924.

[*Translation*] Paris, September 16th, 1924

At its administrative meeting held on August 5th, 1924, the Assembly of the International Union for Combating Tuberculosis noted with great interest the attention which the Health Committee of the League of Nations is devoting to the question of tuberculosis and the work which it is accomplishing in this domain.

The executive bodies of the International Union for Combating Tuberculosis are fully conscious of the fact that the League of Nations, exerting its influence on the various Governments by means of enquiries or by the conclusion of international agreements, can greatly assist them in their work.

The Assembly of Lausanne therefore, realising that the immense task of fighting tuberculosis calls for agreement, co-operation and collaboration between all organisations, both private and official, unanimously adopted the following resolution :

> "The International Union for Combating Tuberculosis earnestly hopes that the Health Committee of the League of Nations will, in co-operation with the Union, give its most careful attention to the problems connected with the prophylaxis of tuberculosis and will endeavour to interest the authorities of the different countries in the practical attainment of such prophylaxis."

I should be very grateful if you would kindly bring this recommendation to the notice of the Chairman of the Permanent Health Committee of the League and would also communicate it to the Medical Director, Dr. Rajchmann.

On behalf of the Executive Committee :

(*Signed*) Léon BERNARD,
Secretary-General.

Annex 32.

C. H. 243 (2).

WORK OF THE COMMISSION ON INSTRUCTION IN PUBLIC HEALTH

Report by Professor Léon Bernard, submitted to the Committee on September 30th, 1924.

At its meeting held on January 11th, 1923, the Health Committee adopted the following proposal which had been submitted by our colleague, Dr. CHODZKO :

> "The Health Committee asks the Medical Director to collect information concerning the position in the universities of Europe, America and Japan as regards the study of medical and social hygiene, and to present the results of his enquiries at the next session of the Committee."

The Health Section of the Secretariat embarked immediately upon its task. The first results soon showed that, if the aim proposed by Dr. Chodzko was to be attained, and the Committee was to be furnished with really complete and useful data, it would be necessary to proceed on different lines and to develop the scope of the enquiry and the methods employed in collecting the necessary information. Therefore, on February 20th, 1924, the Health Committee adopted the following resolution :

> "The Health Committee decides to appoint a Commission to examine the documents already collected by the Health Section regarding instruction in health and social medicine in the different countries of Europe and of America and in Japan;
>
> "To continue this enquiry, making its scope as large as necessary;

"And to make recommendations in favour of the courses of study which in its opinion are most likely to yield the highest value in public health education, both from the scientific and practical points of view."

As a result of this decision, MM. Léon Bernard, Chodzko, Madsen and Ottolenghi were elected membere of the Commission, while Dr. Rajchman was good enough to assume the task of secretary. Professor Welch, Sir George Newman, Dr. Andrew Balfour and Dr. Stampaz were elected correspondent members, and the post of chairman was conferred upon me. I accepted this high honour with embarrassment, for others would have been better qualified for the post; but I felt that you wished in this way to pay homage to the ancient University of Paris, ans I desire to assure you of my deep gratitude.

The Commission met on the eve of our present session. With the exception of Sir George Newman and Dr. Andrew Balfour, whose absence was regretted, all the members were present. I believe I am interpreting their feelings in expressing special thanks to Professor Welch, who has been so good as to assist us with his authority and experience. In addition, Dr. Freeman, of Baltimore, and Mr. Velghe have also taken part in our debates.

In the course of our discussions, we outlined the scope, and decided upon the form, of our activities. Let us say at once that, in conformity with the resolution which led to the creation of the Commission, we took as broad a view as possible, both of these activities and of the field of our enquiry. The principles which served us as a starting point may be formulated as follows :

Unless a body of trained experts is formed, no public health work is possible. Withou tthe collaboration of a medical corps having a clear perception of the aims and methods of preventive medicine, the work of these experts would remain imperfect and sterile; without the support of the masses, hygiene would appear as an arbitrary collection of prescriptions and irritating formalities, resembling police regulations, and would remain a dead letter. The three aspects of the problem are closely related, and if our efforts are to be successful this interdependence must be remembered.

Admitting, therefore, the truth of this fundamental principle, we must consider the best methods of training public health experts, of giving doctors a true conception of the requirements and possibilities of health work, and of reforming the habits of the public and inculcating the automatic practice of hygienic methods.

This conception renders it desirable to consider a general, a medical and a special public health education.

General education should aim at the universal introduction of hygienic habits of life; it should therefore be imparted in different degrees and in varying forms in all educational establishments and all classes of society wherever a large audience can be gained — in schools, in colleges and in lycées for boys and girls; in teachers' training schools; in special technical schools and in finishing schools; and also in barracks, workshops, etc. It will readily be understood that the study of so vast a subject would carry us very far; in any case, as regards elementary teaching and the dissemination of the principles of hygiene, valuable information can be obtained from the League of Red Cross Societies.

It has not, however, seemed possible to exclude it from our investigations, and we have decided, in the course of our enquiry, to collect all the information relating to propaganda for the masses, its methods, its organs (public administrations, private institutions, etc.), the manner in which propagandists are recruited and trained; and, further, such information as concerns the teaching of hygiene in elementary classes, in lycées and colleges for young people, in the institutes of higher education, particularly the schools of chemistry, as well as information regarding the manner in which the masters who will teach hygiene in all these schools are trained.

It was agreed that while this part of the enquiry would not be neglected, the members of the Commission should not make it their chief objective but should direct their attention first and foremost to the chief aim of our work — namely, what we term medical and special public health education.

Medical instruction in health includes the instruction to be given in this respect to medical students in the universities. We shall pay attention more particularly to the place given to public health and the methods of its instruction in the course of study of the medical students, as well as the organisation and the resources, and the professorships of public health. This part of our task — the training of the doctors of to-morrow, adapted to our present conception of medicine — is the most serious part; there can be no doubt that public indifference to health matters is not the only nor the most serious obstacle with which we are faced; this indifference can be easily overcome. The smallest educative effort in this direction rapidly meets with success. Abundant proofs of this statement exist.

Indeed, we must confess that in many countries the medical profession shows a deplorable ignorance and even hostility with regard to public health matters and social medicine. This forms a serious obstacle to our efforts and aspirations, and we must do away with it; we must have the doctors on our side. It is a matter of logic, practice and professional morality. The doctors must be convinced not only of the position due to them in public health work but also of the extent of the knowledge and aspirations which this position implies; they must be rendered capable of fulfilling this part of their task and at the same time they must be shown that it is not incompatible with their more traditional duties; in a word, doctors must be made to realise that the knowledge and practice of preventive medicine can be reconciled with that of curative medicine, enhancing the position of the doctor in society and in no wise curtailing his prerogatives and legitimate interests; and that the ideals of social hygiene will increase the moral prestige of the doctor without detracting in any way from the Hippocratic tradition nor from professional advantages.

If these ideas are to permeate the minds of doctors in the near future, it will be due to well-conceived and carefully directed instruction in hygiene; clearly, to attain this result, teachers of all branches of medicine must be convinced of the need and must emphasise it in their teaching.

Medical students must be instructed in these matters by their professors; but, in practice, it is mainly through instruction emanating from the chairs of hygiene that we shall secure the improvement we so much desire.

If, however, medical practitioners are to take their full share in establishing preventive medicine, and are to assist in improving public health methods, we still have to decide whether it is preferable, or even possible, that they should themselves assume the direction of the public health services or whether these services should be in the hands of technical experts, specialists both in teaching and in practice. We must examine how these two conceptions have been applied in different countries and must endeavour to distinguish the results obtained from each method. In a word, we must seek the best method of instructing doctors in the fundamental principles of their profession on its new basis and in the extended scope of their work. At the same time we must inculcate a sense of emulation in the protection of public health and a desire to co-operate for this purpose with the technical health experts of the public health administration. We should investigate curricula (lessons, practical work, probationary terms), the duration of health studies and the nature and obligatory character of examinations.

We must, however, emphasise the fact that we do not cherish any vain hope of standardising the work of chairs of hygiene. That does not and cannot come within the scope of our ideas. We merely feel bound to point out that the idea conveyed by a chair in hygiene is not the same in all universities. This is partly due to the fact that the training which teachers of this branch of medicine undergo varies from one university to another. It will be of interest to examine this variation, and also to consider whether it is advisable for a chair in hygiene to be a single foundation, embracing every aspect of this complex question, or whether the work should be divided. What relation should exist between the chair in hygiene and instruction in social medicine, bacteriology, parasitology and tropical hygiene, health and labour conditions, health legislation, physical training, etc.?

Another point which we shall consider is : what share can chairs in hygiene in the Faculty of Medicine take in teaching hygiene, and even supervising health arrangements, in other faculties of the same university? It is instructive to note what is being done in this direction at Harvard University, Boston. There you have one professor teaching hygiene to the medical students and another professor responsible for the instruction of the other students in health matters, as well as for the supervision of sanitary arrangements in the other faculties, who holds the position of health officer to the University.

The special teaching of hygiene includes the technical training of health specialists.

The latter should be divided into two distinct categories : technical medical experts called upon to take technical positions in the public health service; and technical experts in civil engineering, architects and sanitary engineers, who are specialists of the highest importance from the public health point of view.

We propose to discuss more particularly the training of technical medical experts.

This training, which is of comparatively recent origin, has assumed very many different forms in the various universities of the world; one form, which seems to be perfect, is that established by Professor Welch at the John Hopkins University, under the ægis and thanks to the generosity of the Rockefeller Foundation.

But, on the assumption that this school of hygiene provides a prefect model, are we simply to adopt its principles and to propose that institutions shall everywhere be established on the same lines? The question is worth consideration for two reasons : in the first place, we may venture to doubt whether it would be desirable, or even possible, to establish a large number of complete institutions of that type. Should we be able to obtain everywhere the necessary men, materials and financial support? And, even admitting this to be possible, would not the wholesale establishment of such a type of school surpass our actual needs?

Secondly, we cannot conceive a "standardisation" — to use a current phrase — of special education in hygiene. We need, in the first place, to suit and adapt the training of specialists to the general level of prevalent ideas and customs and to the conditions of the public health organisations, which vary in every country. What, for instance, would be the use of training a large number of specialists if we could never find employment for them? On the other hand, how are we going to establish organisations providing for the appointment of health officers if suitable experts are not available? We do not mean that it would not be highly advantageous for all countries to attempt to realise parallel progress between the special study of hygiene and the achievements of the public health science, and to stabilise the factors of this parallel progress without impairing its development and efficiency.

We shall obviously be bound, in the long run, to turn our attention to the relations between the development of the public health organisation and the teaching of hygiene.

Special instruction in hygiene can, indeed, be given by two types of institutions : either special courses can be organised by the chair or chairs in hygiene of the faculties of medicine, the professor of hygiene enlisting the help of assistance for the various special branches of a complete course of hygiene, especially public hygiene; or else, the instruction can be given in special schools, more or less adequately equipped and established by the various administrative authorities within the university or not, as the case may be, involving attendance for some specific period; such schools, like the one at Baltimore, may be regarded as actual faculties of hygiene, with a plurality of chairs.

It is clear that health officers who have obtained diplomas as a result of such dissimilar training will possess very varying qualifications; there will be very little equivalence in the cost of their studies or the time devoted to the obtaining of these different degrees. We are therefore

confronted with two entirely different sets of ideas. On the one hand, it is clearly desirable that health experts and sanitary officials should be recruited from among doctors whose general standard of training is very high and who possess at the same time the best possible qualifications. But if it is our object to attract a great number of candidates and give them so thorough a training which, being thorough, will be necessarily long and ardous, these persons must be able to hope for an assured future in proportion to their skill and training — in other words, profitable and honourable positions.

This relationship between the value of studies and the general merit of the candidates, on the one hand, and the assurance of a career, on the other, is so close that we cannot consider one side of the problem independently of the other. The problem forms an indivisible whole.

In our enquiry we shall still have to arrange the recruitment of candidates for every branch of higher health studies, the curricula and subjects of instruction, their grouping for the formation of different categories of specialists, the organisation of examinations for diplomas, the cost of studies and post-educational studies. Let us explain these different points. As regards the recruiting of candidates, we need to determine the conditions for admission — namely, what class of candidates shall be accepted, and on what grounds such acceptance shall be based — the interval of time fixed between the termination of a candidate's general medical studies and his admission to special studies in hygiene.

As regards curricula, it will be desirable to ascertain what subjects are taught in the various higher courses of special studies and in the schools. Are all these subjects grouped in one scholastic course or are they, as in Baltimore, assembled in such a way as to group scholars in different courses, leading them up to specialised and various diplomas?

This question leads to another one. Is it in the interests of public health merely to provide for the training of medical health officers possessing full technical instruction or to provide, in addition, for the training of health officers specialised in tuberculosis, venereal diseases, physical and moral education, school health, malaria studies, health at sea, tropical diseases, etc.?

However that may be, it appears necessary for the purpose not only of co-operating in the progress of science but also of ensuring that health officers, in addition to other practical knowledge, shall possess a scientific spirit and an interest in research work, that schools of hygiene, of whatever kind, should not be training centres only but should also devote themselves to research work. It would therefore be desirable to ascertain what has been accomplished in this respect in existing schools.

In addition to the training of expert medical officers, we ought to consider the training of non-medical experts, inspectors of labour, food inspectors, architects and sanitary engineers, sanitary administrators and chemists engaged in public health work. Should these various categories of public health workers receive instruction in hygiene in their own schools or should they pass through health schools that would provide special instruction in these matters?

In the same way, what should be the training centre for the auxiliary sanitary staff, more especially for visiting nurses and also for other less important auxiliary services, such as that of disinfection?

The relationship between special training in hygiene and the health administrations should also engage our attention; to what extent do these administrations assist in the drawing-up of programmes? How much do they contribute to the funds of educational institutions? Are they represented on the examining boards? Do they attach privileges or rights to diplomas thus obtained? Do they open the public services to the pupils and do they organise probationary periods in their services for candidates who are either taking their examinations or have obtained their diplomas? All these questions find different solutions in different countries and should have their place in our investigations.

Lastly, it seems necessary for the purpose of maintaining the standard of medical health officers to provide them with finishing courses after they have entered upon their career. This sytsem is practised in some countries, and it would be interesting for us to be able to throw some gilht on this subject.

* * *

The Commission has also decided upon certain methods of work which it is submitting for your approval. They are three in number :

1. It will make use of all the documents collected at the Secretariat both on instruction in hygiene and the organisation of the public health services in different countries.

2. It will make use of the documents gathered as a result of the interchanges in so for as they deal with these two points;and no doubt when it has completed its work on special instruction in hygiene it will be able to make suggestions in regard to a systematic plan of interchanges.

3. Finally, it will institute enquiries on the spot, as this appears to be indispensable for the purpose of obtaining a clear and impartial view of the position in each country. With a view to preserving this impartiality, and in order that every country visited shall be treated by the visitor with equal impartiality, we propose that none of us be entrusted with an enquiry in his own country. Naturally, each journey will be prepared by the Secretariat in conjunction with the members of the Health Committee for the country concerned, and also in conjunction with the Permanent Committee of the International Office of Public Health, but we propose that the visitor should not be a national of the country to be visited. For each country, however, the preparatory work will be done, in consultation with the Secretariat, by whichever member of the Committee or of the Office is in a position to undertake it.

It is also important that there should be no misunderstanding as to the sense in which we use the word "enquiry". It bears absolutely no suggestion of a visitation or inspection. All that we propose to do is to collect information as full and reliable as possible. This information will be obtained from the documents which we shall collect, and, when occasion arises, from personal investigations which we shall conduct with the assistance of the universities and departments visited.

We shall begin by drawing up, as soon as we areable, a first general survey of medical and special instruction in hygiene in certain European countries.

In order that the same guiding lines may be followed in all the investigations of the different members of the Committee who will be sharing the work, we have prepared not exactly a questionnaire but a memorandum. This memorandum in no way limits our freedom of action but, on the contrary, will be either modified or amplified, according to such unforeseen discoveries as may be made by members of the Commission in various countries.

The following are the headings which will serve as a guide in our enquiry :

I. *Instruction in Hygiene for Medical Students.*

1. Programme of instruction :

(*a*) Duration.

(*b*) Principles involved (teaching, practical work and stages).

2. Organisation of chairs in hygiene and date of creation.

(*a*) Are there one or more chairs in hygiene for each faculty or university?

(*b*) Relation between the chair or chairs in hygiene and instruction in bacteriology, parasitology, tropical hygiene, instruction in social hygiene, industrial hygiene, demography, sanitary statistics, sanitary administration, and physical education.

3. Training of professors in hygiene.

4. Material and staff required; endowment of chairs.

5. University examination and endowments.

II. *Instruction for Health Experts.*

This part, with the preceding section I, forms the first objective of the Commission's enquiry.

6. Organisation of the instruction for medical sanitary officials, and date of its creation.

(*a*) In faculties, through chairs of hygiene and special courses.

(*b*) In special schools of hygiene; the relations of these schools both with the university and the health administration.

(*c*) By special courses and special schools according to requirements.

7. Duration and cost of instruction.

8. What organisation is responsible for schools of hygiene for promotion of scientific research work?

9. Recruiting of candidates.

(*a*) General education and conditions of admission.

(*b*) Interval between termination of general medical studies and commencement of studies in hygiene.

10. Leaving examinations and special diplomas granted by faculties in the special school. Subjects of examination; composition of examining boards; participation of health administrations; probationary period in the public health service.

11. Courses of instruction and diplomas for hygiene specialists (school hygiene, tuberculosis, venereal diseases, puericulture, malaria, maritime services, inspection of work, tropical hygiene).

12. The future of persons holding diplomas; rights conferred by diplomas; number and nature of health posts; influence of the health organisations on the teaching of hygiene.

13. Post-graduate instruction; advanced courses for the use of health officers.

14. The training of non-medical health personnel. Visiting nurses; auxiliary health personnel; disinfectors.

15. Training of sanitary engineers and architects (sanitary engineering). Is this instruction organised in the schools for engineers and architects or in the special schools of hygiene?

16. Training of the non-medical officials of health administrations.

III. *Popular Teaching and Propaganda in Hygiene.*

This section of the Commission's work will follow after that indicated above, but the members should collect such documents and information as are available with a view to their further use.

Such documents and information should deal with :

17. The methods used in the various countries for popular propaganda.

18. The action taken by public administrations and voluntary societies in using and popularising these methods.

19. The technical training of persons in charge of popular propaganda.

20. The teaching of hygiene in elementary schools, lycées and colleges.

21. The technical training of persons in charge of suc hteaching (masters, professors at lycées and colleges).

22. The teaching of hygiene in the various schools of higher education and non-medical faculties, by special professors or by professors of hygiene of the faculties of medicine.

The Commission's work, conceived in the spirit which I have indicated, will be conducted within the limits set by the funds allotted to it by the Committee. A first estimate of the cost suggests that no serious outlay will be entailed.

Gentlemen, I need not plead before you the value of the enquiry which you have instructed us to undertake — an enquiry regarding which I have outlined the course which seems to us preferable. The improvement of public health depends primarily on the progress and diffusion of nstruction in hygiene. If you concur in our proposals, the Committee, I can assure you, firmly ntends to bring to a successful conclusion the task which you have entrusted to it.

Annex 33.

C. H. 224.

SCHEME FOR THE STUDY OF THE EARLY DIAGNOSIS AND EARLY TREATMENT OF TUBERCULOSIS

Proposal by Dr. Tsurumi, submitted to the Committee on September 30th, 1924.

I. The methods of early diagnosis of tuberculosis by tuberculin have not hitherto been the subject of any common understanding between the specialists of different countries; nor has any standardisation of technique been attained.

In the absence of any such standardisation, it is quite evident that statistical results are in no way comparable as between different countries. Despite the bacteriological and serological difficulties to be met, I still think it would be a distinct advantage to establish a comparison between the various diagnostic methods now used and, if possible, to arrange for their standardisation.

The Health Committee, already occupied as it is with the standardisation of sera and certain serological reactions, should, I feel, also undertake this question of the standardisation of the different methods for the serodiagnosis of early tuberculosis, the solution of which would be a really valuable piece of work. The Committee should also include in the enquiry some other questions related to the same subject, more especially that of the real value of the preventive measures now employed (including vaccines) against tuberculosis.

To resume, my suggestion may be formulated as follows :

I. Comparative study of the methods of diagnosis of incipient tuberculosis :

(1) The reactions of the different tuberculins :

(*a*) Preparation of Koch's tuberculin, etc.
(*b*) Toxicity of tuberculins.
(*c*) Titration of tuberculins.
(*d*) Cutaneous, subcutaneous and intradermal reactions.

(2) Complement of fixation.

II. Comparative study of preventive measures and of systems of early treatment :

(1) Immunisation with Koch's tuberculin, and with the vaccines of Calmette, Shiga, Dreyer, Arima, etc.

(2) Chemotherapy.

II. — Comparative Study of Measures of Prevention and of Systems of Early Treatment

As a consequence of the war, a certain number of public health administrations have found themselves obliged to undertake important schemes of reconstruction and to reorganise the social life of wide regions. Again, by reason of the disorganisation of sanitary administrations and the difficult economic conditions of certain countries at the same time, the tuberculosis peril appears to have extended progressively. For these various reasons it would seem that the Health Committee ought to undertake enquiries and comparative studies of the value of the measures taken in all countries for the prophylaxis of tuberculosis. These studies should cover the results of the use of dispensaries, of sanatoria, of schemes for the housing of children in better environment, etc. — in short, all social institutions and the conditions of their establishment and employment. It would be really useful to have early and precise data of the results to be expected of similar institutions, in relation to the expenses involved by them.

On the other hand, the systems of active treatment and prophylaxis by tuberculins and vaccines are so numerous that the Health Committee ought perhaps to initiate and co-ordinate systematic studies and enquiries as to their respective value.

Annex 34.

C. H. 244.

BUREAU OF EPIDEMIOLOGICAL INTELLIGENCE IN THE FAR EAST

Report by Dr. Fitta, approved by the Committee on September 30th, 1924.

Since the last meeting of the Health Committee, communications have been received from the Government of Australia, New Zealand and Siam, each expressing its approval of Singapore as the site for the Bureau of Epidemiological Intelligence in the Far East. A further communication has also been received from the Dutch Government, which, while regretting the fact that Batavia is not the port selected, agrees in the circumstances to the choice of Singapore.

The Council of the League of Nations, in June 1924, approved the recommendation made by the Health Committee at its last session that the proposed Bureau of Epidemiological Intelligence in the Far East be established at Singapore, and accepted the contribution which the International Health Board of the Rockefeller Foundation has undertaken to place at the disposal of the Health Organisation for the purpose in view. The sum thus available for the installation and working of the Bureau for a period of five years is $125,000 (American), of which $50,000 may be expended during the first year. The Council further authorised the Medical Director to enter into formal communication with the International Health Board of the Rockefeller Foundation and to determine, with the concurrence of the President of the Health Committee, the details of the scheme by which this contribution may be most fruitfully utilised for the purpose in question.

With the consent of the local authorities, Dr. Gilbert Brooke, Chief Health Officer and Port Health Officer of Singapore, has accepted an invitation to take over the direction of the Bureau as a part-time duty.

The Commission approves the proposal to hold a conference in Singapore in the near future — December 1st is suggested as a suitable date — to which each Government in the Far East is being invited to send a delegate, informed of his Government's desires and opinions regarding the work which the Bureau is designed to carry out. This conference will consider the detailed working of the Bureau, in particular :

1. The nature and amount of the information which each Government is prepared to send at regular intervals to the Bureau and the means of communication — cable, wireless, etc.

2. The form in which this information shall be collated and sent to each of the Governments interested, and the means of transmission.

3. The assistance which each Government is in a position to give regarding the transmission of this information to and from the bureau, and its distribution in its own country, wireless facilities, special cable rates, etc.

4. Such other matters concerning the functioning of the bureau as delegates may be instructed to bring before the conference, bearing in mind the limitations in scope of its activities imposed by the resolution authorising its creation.

It is proposed that Dr. Norman White should represent the Health Organisation at this conference.

The Commission desires to emphasise once again that the Bureau is designed to represent an extension to the Far East of the Epidemiological Intelligence Service of the Health Section

of the League of Nations. To this end, it views with approval the proposal made by the Medical Director that a well-qualified statistician with an intimate knowledge of the work of that service, who is at present employed in the Health Section, be attached to the Singapore Bureau.

It is fundamentally important that the Bureau should be made as useful as possible to the Health Organisation in the Far East. It is therefore recommended that the possibilities be considered of utilising it as a centre for the distribution of information and documentation, in addition to the functions it is primarily designed to serve.

Sanitary Convention for the Far East

The replies that have been received from Far Eastern administrations, which were asked to formulate their observations regarding the draft convention contained in Dr. Norman White's report, are too few to permit of the Commission framing any recommendation.

Annex 35.

C. H. 251.

WORK OF THE OPIUM COMMISSION

Report by Dr. Carrière, approved by the Committee on September 30th, 1924.

In its meeting held on February 15th last, the Health Committee, after hearing and discussing a report submitted by the Mixed Sub-Committee on Opium dealing with the investigations carried out by it for the purpose of determining the legitimate requirements — medical requirements and scientific requirements—in narcotic drugs, came to the conclusion that it was impossible to fix with absolute precision a figure representing these needs. The figure of 600 milligrammes of raw opium per head per annum adopted by the Mixed Sub-Committee has been criticised as being too high by the Committee, and it was proposed to reduce this figure to 450 milligrammes, with the reservation that it should be considered as a maximum and that, as the figure had been established solely on the basis of estimates furnished by countries with a highly developed system of medical aid, it could only be applied to countries in which similar conditions existed.

The Committee at the same time determined to inform the Advisory Committee on the Traffic in Opium that, with regard to fixing a figure for the legitimate needs of countries in narcotics, it considered its collaboration as at an end. (See Minutes of the first session of the Committee, p. 40.)

The Health Committee was instructed by the Advisory Committee on Opium to make preparations for a fresh international conference on opium, and, having taken cognisance of this resolution and of the reservations by which it was accompanied, it addressed the following request to the Chairman of the Health Committee :

> 1. To complete the enquiries and supplement the information in support of the figure of 450 milligrammes, with a view to justifying this figure at the forthcoming conference, and to authorise the Health Section to take the necessary measures to procure this additional information.
>
> 2. To give the details with regard to this general figure of 450 milligrammes by indicating the proportion of raw opium consumed as such, and that of morphine, heroin, codeine and other narcotics included in this figure.

In the course of the second session (meeting held on May 9th, 1924) the Health Committee heard a report submitted by the Opium Committee which it had set up for the purpose of studying these various questions. This Committee was composed of Dr. Chodzko, Professor Jorge, Professor Nocht, M. Velghe and Dr. Carrière. The Health Committee decided not to insist on the decision arrived at in the course of its second meeting, in accordance with which it stated that the fixing of the average figure corresponding to legitimate requirements in narcotic drugs should no longer take up its attention. The Committee thought that, in view of the fact that the Preparatory Committee for the Conference on Opium had asked for additional information in order to justify before the Conference the figure of 450 milligrammes, adopted with the reservations already indicated by the Health Committee, it would at any rate be advisable to consider the possibility of furnishing this information by utilising the data obtainable from hospitals and sick-insurance societies. The Health Committee has therefore authorised the Health Section and its Opium Committee to pursue these investigations and gave a definite reply to the Preparatory Committee for the Conference on Opium with regard to this first point.

As regards the second request made by the Preparatory Committee, the Health Committee was of opinion that it was not possible at the moment to give details of the figure of 450 milligrammes, in view of the considerable variations met with in the use of particular narcotic drugs in different countries, so that the establishment of average figures is out of the question, and calculations of this nature would necessarily lead to artificial and arbitrary conclusions. The Health Committee therefore decided to inform the Preparatory Committee for the Conference on Opium that it was not possible to furnish the indications required with regard to this subject. (See Minutes of the second session, pp. 15 and 30.)

In conformity with the decision just referred to, the Health Section has endeavoured to complete the data concerning the use of narcotic drugs in hospitals and sick-insurance societies. The documents collected by it have been submitted to careful consideration by our expert, Professor Knaffl-Lenz, of whose work we should like once more to express our admiration. The results of this work form the subject of the report which you have before you (Appendix). It is accompanied by detailed statistical tables which also have been laid before you, and with regard to which Professor Knaffl-Lenz is prepared to furnish the necessary explanations.

This report emphasises a somewhat remarkable similarity between the estimates established by Professor Knaffl-Lenz which average a figure not far removed from that of 400 milligrammes of raw opium annually per head. This similarity proves that the figure of 450 was not absolutely arbitrary but that it represents a maximum—a point which the Health Committee had already urged. This maximum again holds good only for countries possessing highly developed medical institutions, and cannot serve as a criterion for the purpose of calculating world-wide requirements, in view of the fact that those countries which have not yet fully developed their medical services use far smaller quantities of opium derivatives. The figure of 450 milligrammes therefore represents, as it were, the European coefficient, and, in order to establish the amount corresponding to world needs as a whole, a similar coefficient for each continent would have to be established.

Hitherto it has been impossible, owing to lack of correct information, to establish an average figure for the requirements of cocaine. The data which Professor Knaffl-Lenz has been able to utilise have allowed him to supply this defect, and to fix the figure at 7 milligrammes per head annually. It should be remarked here that, cocaine being more especially used in hospitals, the information collected with regard to it presents a degree of certainty very much greater than is the case with regard to opiates. But it should be added that the figure of 7 milligrammes is a maximum, valid only in the case of countries with well-organised medical assistance, and that it is no doubt destined to experience pronounced fluctuations depending to a greater or less extent on the employment of cocaine substitutes in place of the drug itself — a substitution the extent of which is, in the final analysis, a question of price.

In conclusion, Professor Knaffl-Lenz has tried to establish, on the basis of information furnished by 16 European States, representing a population of 250 millions, the details of the total figure for the consumption of opiates in these countries. But it is of importance to state that the figures obtained in this way have a relative value only, and that, owing to the differences to be met with in medical practice in different countries, they cannot be used in calculating the requirements of each of them in opium and in opium derivatives. This is a point on which special stress should be laid when Professor Knaffl-Lenz' report is forwarded to the Preparatory Committee.

With regard to this last point, we must also call attention, in order to avoid all misunderstanding, to the difference to be found between the figures calculated by Professor Knaffl-Lenz and those obtained by the Opium Section. This difference is due to the fact that the calculations made by the Opium Section have not all been carried out on the same system, so that the values obtained are on the whole from 20 to 30 per cent too high. It would be superfluous to go further into the details of a report which is before the members of the Health Committee, and which its author will no doubt be called upon to explain to them. This report appears to us to reply, in as convincing a manner as the data placed at the disposal of Professor Knaffl-Lenz rendered possible, to the request formulated by the Preparatory Committee for the International Conference on Opium. We request the Health Committee to adopt the conclusions to be found in it and to communicate the report to the Preparatory Committee, accompanied by the reservations which we have formulated above.

We must now refer to a certain number of questions of which the Health Committee was notified at its first meeting, by means of a report submitted by the Mixed Committee, which it had requested its own Committee to consider. The chief points are the possibility of prohibiting the manufacture of heroin, the propaganda against cocainomania and morphinomania, and the modifications to be made to the Hague Convention.

With regard to the question of heroin, we would like first of all to rectify certain misunderstandings. In 1923 the Opium Section had asked the Health Committee to be so good as to consider whether it would not be advisable to prohibit the manufacture of heroin. Professor Knaffl-Lenz, who was at the time a member of the Health Section, was entrusted with the consideration of this problem. He submitted a report to the Section, but the latter did not feel justified in assuming the responsibility of forwarding this report to the Opium Section, and asked that it should first be submitted to the Mixed Sub-Committee or to the Health Committee. That is why the report came first before the Mixed Sub-Committee and later before the Health Committee. It is therefore incorrect to state, as had been done in the Advisory Committee on the Traffic in Opium, that the Mixed Sub-Committee had, upon its own authority, dealt with a question which it had not been requested to consider. On the contrary, it is due to the fact that the Opium Section wished the problem to be studied that it came before the Mixed Sub-Committee for consideration.

Having said this, we will return to the question itself—namely: In view of the dangers which

the abuse of heroin presents, are the therapeutic benefits to be gained from it such that its manufacture should be authorised? Or, on the contrary, should this manufacture be prohibited?

Professor Knaffl-Lenz has drawn up a memorandum with regard to this question, which has been communicated to the members of the Health Committee, and which summarises what we know at present about heroin; many chemists and doctors believe that the slight therapeutic benefits do not compensate for the danger involved by its highly toxic character—three or four times higher than that of morphine—and which accentuates also the danger resulting from customary use—a danger which is still further increased owing to the fact that heroin can be taken in pinches like cocaine. There is no doubt that heroinomania exists, and that its victims are becoming more and more numerous. At the Sing-Sing Prison in New York, for instance, it is estimated that, of the number of prisoners addicted to narcotics, at least 75 per cent are heroinomaniacs. It is therefore legitimate to consider whether it would not be advisable to prohibit the manufacture of such an eminently dangerous drug.

After having considered the question, your Opium Committee has arrived at the conclusion that the question cannot be finally settled at present. It is indeed a problem of a medical nature which should be previously discussed in medical circles, and in this form : Are the dangers of a social character caused by the retention of heroin in therapeutic chemistry and by its abuse compensated for by the therapeutic advantages of this drug? If not, would it not be advisable to abandon the use of this drug, thereby making the prohibition of manufacture possible?

With regard to propaganda against cocainomania and morphinomania, we would recall the fact that the Health Committee has already had before it a memorandum by Professor Knaffl-Lenz, urgently requesting that, in the education of medical students and of doctors, stress should be laid on the desirability of moderation in the use of narcotics in their prescription. Since then, the question has been laid before the Third Committee of the Assembly of the League of Nations, which, at its meeting held on September 10th, 1924, adopted a resolution submitted by M. Sokal, the Polish Delegate, which reads as follows :

> "The Assembly requests the Council to be good enough to ask the Advisory Committee on Traffic in Opium whether it considers it desirable and expedient that the work undertaken by the League of Nations in connection with the Traffic in Opium, under Article 23 of the Covenant, should be completed by the preparation of a scheme of propaganda to acquaint the masses with the terrible consequences resulting from the use of dangerous drugs, and thereby to restrict the consumption of such drugs. Should the Advisory Committee be of opinion that it is desirable and expedient to prepare such a scheme, the Assembly of the League of Nations requests the Council to submit the scheme to it at its next session, and to indicate what measures are required in order to carry it into effect."

Your Opium Committee believes that a propaganda campaign amongst the masses—prot bably by means of lectures, conferences and films—as suggested in M. Sokal's resolution, mighprove dangerous and achieve results exactly contrary to those desired by the author of the reso lution. For there would be a risk of exciting unhealthy curiosity and of leading people who had not perhaps so far thought of it to cocainomania and morphinomania.

A campaign of this nature must not be compared with those which have been carried out, for instance, against tuberculosis and venereal diseases; the conditions are entirely different. With regard to tuberculosis and venereal diseases, it is solely necessary to emphasise the risk of illnesses, which have no attractive aspect as such. With regard to cocainomania and morphinomania, the matter is quite different. It would, indeed, be very difficult to point out the dangers without also alluding to the aspect which attracts the victims and at the same time exciting the unhealthy curiosity to which we have alluded above. We think, therefore, that the propaganda referred to in M. Sokal's resolution should be avoided, and that if statistics on the subject are to be drawn up, as requested by Professor Knaffl-Lenz in his report, enquiries should be addressed to doctors only.

In regard to the modifications to be made to the Hague Convention, they refer first of all to the preparations containing less than 0.2 per cent of morphine and less than 0.1 per cent of cocaine and heroin, and to which the provisions contained in the Convention are not at present applicable. In the report submitted to the Mixed Committee and to the Health Committee, we pointed out that this provision was, to a certain extent, likely to promote illicit traffic, owing to the fact that a proportion of narcotics which might prove to be considerable was thus withdrawn from supervision. We have nothing to add to this remark.

Another of the conclusions contained in the report submitted to the Mixed Committee on Opium referred to the proposal made by the French Government to add to the products mentioned in the Hague Convention a certain number of other products having analogous toxic properties. Our report arrived at the conclusion that, amongst the products mentioned in the list drawn up by the French Government, only the derivatives of ecgonin should be taken into consideration. Here, again, we have no change to make in the conclusions we arrived at.

Appendix.

C. H. 251 (Annex).

JUSTIFICATION FOR THE MAXIMUM FIGURE OF 450 MG. OF RAW OPIUM PER HEAD, PROPOSED BY THE HEALTH COMMITTEE AT ITS SESSION HELD FROM FEBRUARY 11th TO 12th, 1924, AS BEING SUFFICIENT FOR MEDICINAL REQUIREMENTS IN COUNTRIES IN WHICH THE HEALTH SERVICE IS WELL ORGANISED.

At its meeting held in March 1924 the Preparatory Committee on Opium decided to request the Health Committee to furnish more detailed information with regard to the average quantity

of 450 mg. of raw opium per head annually, which had been fixed in the case of countries which possessed a modern health organisation, and also to indicate separately the requirements with regard to morphine and heroin. At the same time the desire was expressed by the Preparatory Committee that these estimates should be drawn up upon a wider basis and that the legitimate requirements of cocaine should also be given.

During the short time at its disposal, the Health Section endeavoured to collect reports concerning the amounts used in general hospitals and by sick-benefit clubs (*Krankenkasse*). All the reports received up to the day upon which the Sub-Committee met — that is September 19th —have been used in drawing up the attached tables.

The maximum quantity (450 mg.) proposed has been arrived at on the following basis :

1. The reports received up to the present from several European countries.
2. The amounts used by sick-benefit clubs.
3. The amounts used in general hospitals.

1. Table V (see document C. H. 232).

The estimates received from seventeen European States [contained in Document P. C. O. I.(1)] have been used in drawing up the tables. In the case of Denmark and of Austria, it was possible to make use of more recent and more correct estimates.

The figures relating to Switzerland have not been taken into account, the Director of the Federal Service of Public Health being of opinion that they are erroneous and that they consequently do not represent actual requirements. The figures communicated by Belgium and Denmark represent the actual amounts used in those countries and should not therefore be considered as simple estimates, as is the case with regard to the other countries; these figures, therefore, are of special importance.

In all the tables the figures are indicated in equivalents of raw opium and basic cocaine. With regard to salts of morphine and its derivatives, an estimate of the corresponding quantity of raw opium has been obtained by taking as a basis the quantity of basic morphine which would have been necessary—theoretically—in the preparation of the quantities of the derivatives and multiplying it by ten. The proportion of raw opium has been fixed for morphine at 10 per cent merely in view of the fact that the total amount of morphine contained in opium is never obtained in manufacture, and during the process of re-crystallisation a further loss occurs. Opium used in the production of morphine shows an average proportion of from 13 to 14 per cent of morphine. The loss occurring in manufacture would seem therefore to have been fully taken into account.

The equivalents of raw opium obtained in this manner for morphia, heroin and codein do not correspond to the amounts arrived at by the Opium Section [Document P. C. O. I. (1)]. The calculations made by the latter were not carried out on a uniform system. In the case of morphine and codein, no discrimination was made between basics and salts, and therefore the equivalent values indicated in the document quoted above are generally from 20 to 30 per cent too high. The average amounts calculated in the manner stated, in respect of the 16 European States with a total population of 250,000,000 as shown in Table V, give the requirements of raw opium as follows :

Medicinal opium.	113 mg. *i.e.* 39 per cent
Morphine	155 mg. *i.e.* 53.4 per cent
Heroin	17 mg. *i.e.* 16 per cent

—a total of 290 mg. per inhabitant.

Requirements with regard to codein have only been indicated by six States, and amount to 46 mg. per head—that is, 25.5 per cent of the total consumption in the said countries. In view of the fact that among these six States there are some in which the total opium requirements are considerably less (1) than the general average, this estimate must be considered as being too low for the other countries, and should be doubled. The average figure of 380 mg. per head, including codein, would therefore represent European requirements. This average figure is only exceeded to an appreciable extent by England and Sweden. The requirements of these two countries—codein included—amount to 547 mg. (England) and 608 mg. (Sweden). (In the figures furnished by England it is not quite clear whether codein is included or not in tis figure ofh 547 mg.)

2. Tables I, II, and III (see documents C. H. 228 and C. H. 237).

Amount used by Sick-Benefit Clubs (Krankenkassen).

Up to the present, only three reports have been received with regard to the amount used by the sick-benefit clubs, the investigations not having been concluded at Warsaw. In 1923 the amount used by the Federal Austrian *Krankenkasse*, to which all the State officials belong, from office-boy to Minister, as well as the members of their families, gives a good idea of the actual legitimate requirements of the population, in view of the fact that the estimate of consumption also includes the quantities of morphine prescribed by doctors for drug-addicts. The total quantity, including codein, amounted in 1923 to 360 mg. of raw opium per insured person; to this quantity should be added the amount needed for scientific and veterinary requirements, which in Austria is estimated at 25 to 30 mg. per inhabitant. Although the consumption of codein by this *Krankenkasse* is double the average consumption of the population, the quantity

(1) The average total consumption in these six countries does not exceed 181 mg.

required would not, however, appear to be higher than the average estimate for the requirements of Europe.

On the other hand, the figure relating to consumption by the Bale *Krankenkasse*, to which 50 per cent of the population belong, appears to be notably less—namely 230 mg. per head. Whereas the Austrian *Krankenkasse* uses 71.6 per cent of its raw opium in the form of codein, that in Bale consumes only 37 per cent; therefore it requires a proportionally larger amount of morphine and heroin. Given the fact that, in order to attain an equal therapeutic effect, 3 to 4 times more codein is required than morphine and six times more codein than heroin, if the Bale *Krankenkasse* substituted the use of codein for that of morphine and heroin, its total consumption would equal that of Austria.

On the other hand, the quantities consumed by the three German *Krankenkassen* during the first quarter of 1923 were notably higher. Unlike the *Krankenkassen* of Bale and Austria, the German local and rural *Krankenkassen* do not include members of families. It is therefore merely a question of adult requirements. Under the terms of a State Law, disabled soldiers have been affiliated to *Krankenkassen*. That among these disabled soldiers there are a large number of drugs-addicts is proved by the fact that, on the average, 0.15 g. of morphine per prescription have been ordered by the local *Krankenkasse*, notwithstanding the fact that the number of women members is double that of the male members.

Industrial *Krankenkassen* include workmen belonging to industrial enterprises; the number of patients is high. This is proved by the number of days of hospitalisation. With regard to the rural *Krankenkassen*, which also only include adult members, the consumption corresponds to the average proposed of 450 mg. of raw opium.

For the reasons given above, the consumption by these three German *Krankenkassen* cannot be taken as a basis for estimating the requirements of the total population.

3. Table IV (see document C. H. 233)

With regard to the average requirements in general hospitals in Belgium, Poland, Austria, Germany and Bale, the figures total 65 mg. per day during hospital treatment. Austria and Germany alone differ from this average.

The Austrian figures are lower. The statistics of the Graz provincial hospital date from the year 1922, in the course of which, for reasons of economy, the prescription of medicaments was reduced as far as possible. The amount used by the general hospital in Vienna for the period extending from June 1st, 1922, to June 30th, 1923, works out to an average of 54 mg.

The German figures exceed the average; they have been furnished by two hospitals in which consumption has probably been larger than in other general hospitals.

These statistics show that the consumption of opium in countries differing climatically and racially is about equal, provided the health organisation in those countries is equally developed.

There is sufficient reason, therefore, for applying the average figure arrived at in respect of the 16 European States mentioned above to the other States of Europe which have not so far furnished reports.

From the medical point of view, the sub-division of the total consumption into medicinal opium, morphine, heroin, and other derivatives, as desired by the Committee on Opium, is not of great value.

The consumption of morphine, for instance, may very well show a decrease compensated for by an increase in the consumption of opium, in view of the fact that the different alkaloids contained in opium and offered as proprietary medecines under the name of Pantopon, Pavon, Omnopon, etc., containing 50 per cent of morphine, are in some cases more useful from the the rapeutic point of view than morphine. As regards the substitution of one preparation for another, the question of price is, in the first place, the determining factor. The total quantity of opium required would not change—it would be more likely to increase—if the use of codein had to be substituted for that of morphine and heroin.

The average consumption of cocaine in 13 States of Europe, with a total population of 222 millions, is, in round figures, 7 mg., but consumption by the Austrian and Bâle *Krankenkassen* amounts to 3 mg. The German *Krankenkassen*, however, require rather more than the European average quoted above.

In the hospitals the daily average during treatment is 3.2 mg.; the Austrian and German averages are the only ones which differ with regard to these figures. The notably higher consumption in Austria is explained by the fact the laryngological clinic in Vienna treats a large number of out-patients, and the quantities used for the latter are included in the figure given above. The same, no doubt, holds good in the case of Germany.

A maximum of 7 mg. per head annually of cocaine should therefore be fixed as representing the requirements of European States. The quantity actually necessary, however, will show great variations in view of the fact that the substitution for cocaine of other preparations such as Novocaine, Tutokain, etc. frequently depends on the question of price.

The averages which have been laid down for Europe—*i.e.* a maximum of 450 mg. for raw opium and 7 mg. for cocaine per head per year—cannot serve as a basis for fixing the total of universal requirements, since, in countries in which the health organisation is not well developed, the consumption is very much smaller. For this reason the requirements in raw opium in the British Colonies, in Africa (Seyschelles, Southern and Northern Rhodesia, Sierra Leone, Swaziland, Nigeria and the Sudan, with a population of about 18 million inhabitants) do not exceed 25 mg. of raw opium and .04 of basic cocaine annually per head. For the purpose of fixing the amount of world requirements, an average should be established for each continent.

Professor E. Knaffl-Lenz.

Annex 36.

C. H. 254.

WORK OF THE TEMPORARY MIXED SUB-COMMITTEE ON ANTHRAX

Report by Professor Ottolenghi, *approved by the Health Committee on September 30th, 1924.*

The members of the Mixed Sub-Committee for enquiring into the processes for disinfecting hides and skins suspected of being infected with anthrax met on September 25th at the Secretariat of the League of Nations.

Present :

For the League of Nations :

M. Raynaud, M. Nocht, M. Ottolenghi.

For the International Labour Office :

M. Glibert, M. Loriga, Mr. Collis.

After a recapitulation of the questions submitted to the Sub-Committee and those which had been discussed at the Paris meeting by the members of the Committee representing the League of Nations, the discussion on the processes in current use in tanning for the disinfection of suspected skins was at once opened.

With regard to the Seymour-Jones sublimate process, one of the members (Dr. Glibert) drew attention to the dangers which might result in practice from the use of this substance on a large scale, not only to the workmen but also to any persons or animals which might come in contact with the waste factory waters. Moreover, it was not certain that the process would be adopted, since it was doubtful whether sublimate solution would be effective unless its action were prolonged, and this would make it necessary to set aside the disinfected skins for some time. He thought that it would be useless—at least in the case of his own country, Belgium—to institute general control of this method, in view of the fact that there was already some opposition on the part of those manufacturers whom he had interested in the question.

It would probably be more expedient to request the British National Committee to direct its special attention to this method, which had for many years been in use by the manufacturer who had suggested it.

Furthermore, attention was drawn to the fact that on page 12 of the Leymann Report ("Anthrax in Tanneries") mention was made of "recent facts established" in America, and it was felt that in this connection it would be expedient for the International Labour Office to ask for further information.

One of the members—Dr. Loriga—said that, although he did not wish to over-estimate the danger of sublimate, which was no more dangerous than another method—namely, the alkaline method—he thought that control was practicable.

The members of the Sub-Committee were of opinion, however, that it would be better to abandon, at least for the time being, the idea of controlling the Seymour-Jones process, particularly as the members who were bacteriologists were not entirely convinced of the efficacy of sublimate as a disinfectant at the strengths employed in this process.

One of the members—Dr. Collis—asked whether it would not be possible to obtain statistics of cases of anthrax among workers in tanneries and transport workers in relation to the origin of the hides which had caused infection. An account was then given of the difficulties of compiling statistics of this kind, in consequence chiefly of the method of classification of imported skins which is carried out in the various countries by the customs authorities, and which attaches greater importance to the last port of origin (re-exportation) than to the actual country of origin of the raw material.

Another member—Dr. Loriga—pointed out that all damp processes were open to criticism, and asked whether it would not be preferable to devote their attention to gaseous disinfectants, since, as had been stated on various occasions at the Sub-Committee, a good surface disinfection would do away with 90 per cent of the cases of anthrax in the industries concerned.

One of the members—Dr. Collis—fully concurred in this opinion, and proposed that they should consider whether it would not be possible to disinfect the skins in the actual shiphold. In this way not only tanners but also dockers and transport workers would be protected. It would be remembered that some of the dried skins arrived salted or naphthalined or treated with arsenic, and that they were loaded amongst other goods. Would the whole cargo therefore have to be disinfected? Even if it were possible to insist that the skins should be loaded in a special section of the hold, it would then have to be settled whether all the skins must be disinfected or only

those coming from infected countries. It was the same question as had already been discussed in connection with wools.

The majority of experts thought that, although they might admit, in a general way, that it was not impossible to disinfect skins before their arrival at the factory, it would nevertheless be essential to know the number of infected skins in a given quantity. It should be remembered that skins originating from Australia and South America hardly ever gave rise to infection. It would therefore be difficult to insist on the trade carrying out a general disinfection.

If they were to have recourse to a gaseous disinfectant, the question would immediately arise : what gas was capable of killing anthrax spores, especially when incorporated in a clot adhering to the skin which had already been dried for a long time. It would perhaps be necessary to soak the skins so as to ensure that the gas would come into contact with the spores. What gaseous disinfectants at present available were capable of disinfecting in this manner? They must exclude halogens, which destroyed the metallic parts of ships; also sulphurous anhydride, which sometimes failed to kill rats and which could therefore hardly be relied upon to kill the spores.

There remained formaldehyde, but it was questionable whether its use would not involve the risk of excessive damage to the skins.

It would, moreover, be imperative to ensure the distribution of the gas in the hold by means of ventilation by pressure or suction, and this would make the process somewhat complicated in practice.

The bacteriological members of the Sub-Committee advanced further objections, but in view of the fact that chemists had recently suggested certain very powerful gases hitherto unknown —at least in industrial practice—they asked that the Sub-Committee should make a recommendation that each member should gather information in his own country as to the value of toxic gases as disinfecting agents against anthrax spores.

Admittedly it is difficult to make experiments on board ship owing to the constant bustle of loading and unloading cargoes. It was therefore suggested that such experiments should take place in factory store-rooms, where there is suitable accommodation; the raw materials are available, and, above all, there is ample time to make thorough investigations. It would then be an easy matter to adapt the methods arrived at in this way to a process of disinfection in the holds of ships.

The view of the experts Ottolenghi, Nocht, leaving aside for the moment the question of gaseous disinfectants and the sublimate process, is that laboratory experiments ought rather to be made on the washing soda and hydrochloric acid processes. The experts of the International Labour Office are in complete agreement that these laboratory experiments should be made and that their object should be to ascertain definitely what is "the best process which at least guarantees a good surface disinfection". But, in the opinion of these same experts, there is the further question to be studied whether the processes approved and recommended by bacteriological experts can be applied industrially without injury to the raw materials. This is a problem of a somewhat different nature.

One of the experts—Ottolenghi—who has for a long time been experimenting on a soda process, expresses the opinion that the general trend of such experiments will probably be in the direction of finding some process of utilising washing soda, which has the support of the bacteriologists and which does not seem to harm the raw materials.

With regard to the process of pickling in hydrochloric acid, it was shown quite clearly that under certain conditions the acid effects the skins and that this process requires special apparatus (particularly troughs not affected by acids).

It is not easy to procure skins naturally infected by anthrax. In order to meet this difficulty, and at the same time to have some criterion of the value of the methods proposed, it was suggested that experiments might be made on artificially prepared coagula, as has already been done. But one of the experts—Ottolenghi—points out that these conditions are not a replica of natural conditions, because the substance on which the disinfectant is placed has an important bearing on the fixing of the latter and may appreciably reduce its disinfecting power. We must therefore reproduce the actual conditions of industry, and, as a matter of fact, Hailer has recently done so. Besides, Professor Ottolenghi does not think that it is so very difficult to obtain naturally infected skins.

The bacteriological experts hope to be able to answer the questions put to them in a few months' time.

Conclusions

The discussion and the work of the Mixed Sub-Committee may be summarised as follows :

1. The members of the Mixed Sub-Committee will collect information in their respective countries concerning the existence and, where possible, the value of toxic gases as potential disinfectants against anthrax spores.

2. M. Ottolenghi for Italy, M. Nocht for Germany, and Mr. Collis for Great Britain, will direct investigations into the comparative value of the methods of disinfection based respectively on washing soda and on hydrochloric acid. Mr. Collis will also collect supplementary information concerning raw materials treated in his country by the Seymour-Jones process.

3. It is now possible to proceed to the formation of National Committees in the following countries : Germany, Belgium, France, Great Britain, Italy, and perhaps the United States and Switzerland. For this purpose it will be the duty of the International Labour Office to get into touch with the organisations concerned, with a view to ensuring their collaboration with the Mixed Committee. The work of the National Committees will be to carry out such experiments as will demonstrate the technical and economic value of the methods under consideration.

These conclusions obtained unanimous approval.

Annex 37.

C. H. 252.(1).

WORK OF THE MALARIA COMMISSION

Report by Dr. LUTRARIO, *adopted by the Committee on October 2nd, 1924.*

1. *General Observations.*

Since the last session of the Committee, the Malaria Commission has carried out the long and comprehensive study-tour approved at that meeting and has acquired a valuable series of impressions on the spot and a very considerable documentation. Meetings of the participating members were held almost daily during the three months of the tour (May 28th—August 28th), and two plenary sessions at its termination in Rome. The Minutes of the tour describe the daily movements and impressions of the members. The Commission, less corresponding members, also met in Geneva from September 14th to 27th, and again on the 30th, to discuss a number of questions of importance, as indicated below.

2. *Corresponding Members.*

Additional to those corresponding members approved by the Committee (Para. 73, Minutes of the Second Session of the Committee), the Commission submits for approval the nominations of Dr. Markoff (Bulgaria) and Dr. Moutoussis (Greece).

3. *Preliminary Reports on the Study-Tour.*

It was decided at Rome that the task of drawing up descriptive preliminary reports of the tour should be confided to Professor Nocht, in so far as concerned the voyage in the Balkans and Russia, and to Dr. Raynaud and Professor. Swellengrebel as concerned the phase in Italy. The reports of Professor Nocht and Dr. Raynaud have been examined, discussed, and—with some minor amendments—approved by the Commission; copies have been distributed to members with this summary (Docs. C. H. 227 and C. H. 240).

4. *Definitive Report arising out of the Tour.*

In addition to the documentary material received, two members were invited to prepare detailed reports dealing with the malaria situation as appreciated by them in each of the countries visited, viz. Professor Ottolenghi and Colonel James for the Kingdom of the Serbs, Croats and Slovenes, Professor Pittaluga and Dr. Moutoussis for Greece, Professor Ciuca and Dr. Markoff for Bulgaria, Professor Swellengrebel and Professor Ciuca for Roumania, Professor Pittaluga and Professor Swellengrebel and Dr. Anigstein for Russia, Professor Swellengrebel and Dr. Raynaud for Italy. The majority of these reports have now been received and are available. A small Sub-Commission drew up a scheme of the main criteria on which the definitive report will be based. This Sub-Commission (Professors Nocht, Pittaluga and Marchoux, and Colonel James) will also examine the question of terminology with a view to establishing the precise significance of the commoner terms employed in anti-malaria campaigns in different countries, so as to avoid confusion in the report. An editorial Sub-Commission (Professor Nocht, Professor Pittaluga and Colonel James) will prepare the report, with the assistance of the Secretariat, which will be discussed by the whole Commission, including corresponding members, in a few months' time. The detailed sectional reports will be annexed.

5. *Programme of Work for 1925.*

The Commission, during the term of its mandate, being anxious to apply further the resolution adopted by the Committee at its Second Session, submits the proposal given in paragraph 10 (*a*).

6. *Albania.*

The Commission has taken note of an interim confidential progress report from Dr. Haigh, now in Albania in accordance with the Committee's decision at its Second Session. From this report, prepared under conditions of no little difficulty, it is evident that Albania's most urgent need is an adequate stock of quinine and the organisation and personnel to ensure its distribution. It is satisfactory to state that the Council of the League has thought well to hand over the sum of some 10,000 Swiss francs remaining from its Albanian Famine Relief Fund for the purchase of quinine to be distributed by Dr. Haigh; and that immediate steps have been taken for its purchase and despatch through the Italian Finance Ministry (Industrial Monopolies).

7. *Greece.*

The report of Dr. Norman White consequent on his visit in Greece (Doc. C. H./Mal. 13) has been subjected to a preliminary examination by a small Sub-Commission (Professor Ottolenghi and Dr. Raynaud). This Sub-Commission also examined a proposal of the League of Red Cross Societies regarding the provision on a large scale of medical institutions for Greece and Turkey —a proposal referred to the Health Organisation by the Council. As a result of the Sub-Commission's work, the Commission has been able to formulate the draft reply given in paragraph 10 (*b*), which it submits to the Committee for its consideration.

8. *Russia.*

In view of the early departure to Russia of Dr. Cazeneuve, who will represent the Health Organisation in liaison with the Narkomzdrav, the Commission invited Dr. Cazeneuve to discuss his programme of work there, in so far as it concerns malaria, and approved the lines of enquiry proposed by him. He will, in particular, try to inform the Commission regarding malaria in the northerly Archangel area.

9. *Quinine.*

The Commission has taken note of and discussed the first reports of Professor Giemsa and Sir D. Prain on two aspects of the quinine problem (Docs. C. H./Mal. 15 and 16); also of the two interesting reports on cinchona alkaloid presented by Professor Marchoux and Dr. Labranca (Docs. C. H./Mal. 24 and 25).

It was decided that one of the first tasks of the Health Organisation was to recommend the investigation on a large scale of the different quinquina alkaloids to be carried out in a variety of malaria countries by a competent personnel. The Commission accordingly presents the resolution in paragraph 10 (*c*) :

10. *Resolutions.*

The Commission presents three following resolutions :

"(*a*) The Health Committee decides to charge the secretariat of the Health Section with the duty of organising, so far as budgetary considerations will allow, as a programme of work for 1925 :

"(1) A study tour of members, experts and correspondents of the Malaria Commission in Sicily, Tunis, Algeria and Morocco in the early spring of 1925;

"(2) A second voyage in Spain and Portugal during August and September or September and October 1925; the duration of each voyage not to exceed six weeks."

"(*b*) The Council of the League of Nations, on the suggestion of Viscount Ishii (Rapporteur) (Annex 37*a*) has transmitted to the Health Committee, for its technical opinion, a letter (Annex 37*b*) from the League of Red Cross Societies accompanying a report by Dr. A. Gauthier dealing with the health conditions prevailing among the Greek and Turkish populations exchanged under the Treaty of Lausanne. The letter and report call attention to the mortality and to the prevalence of disease among these refugees, and put before the League proposals for the provision of sanitary equipment to the value of £350,000 for Greece and £150,000 for the Turks, or £500,000 in all. As this figure was extremely high, the League of Red Cross Societies felt that it must appeal for international assistance.

"The Health Committee, has also received two reports on the position in Greece from the point of view of health : one from Dr. Norman White, who was sent by the Health Committtee, at the request of the Greek Government, to examine the situation, and the other from Professor Pittaluga, on behalf of the Malaria Commission, which has just visited the same region.

"After considering all these documents, the Health Committtee reached the following conclusions :

"I. It is undeniable that the present condition of the populations that have been exchanged is far from satisfactory. This is an accepted fact, despite the lack of reliable statistical data.

"II. Malaria has assumed, in Greek Macedonia more particularly, and in other regions where this disease is endemic, an epidemic and virulent character, thus adding to the distress of the populations and lowering their powers of resistance to diseases of all kinds.

"III. Infantile mortality and tuberculosis, which have assumed unusual proportions, bear witness to the wretched general conditions and the unsatisfactory economic circumstances in which these people are doomed to live.

"IV. The almost entire absence of acute diseases in the form of epidemics bears witness to the very useful work which has been done by an improvised organisation under trying and painful conditions.

"V. Improvement in the sanitary situation is entirely dependent on the improvement of economic conditions. Such improvement will inevitably result from the settlement of the refugees and their complete absorption in the rest of the population, but this result would be greatly facilitated and many lives might be saved were it possible to provide a more up to date health organisation and personnel, better adapted to the task in hand.

"VI. The development and improvement of the present health service, with improved equipment and qualified technical experts, are a vital necessity for Greece at the present time. For this purpose a practical school of hygiene for the purpose of training a staff that would be thoroughly competent in questions of prophylaxis and epidemiology would be of great assistance.

"It is highly desirable that the Greek Government make sufficient provision in its budget for this public health organisation.

"The refugees will be unable to draw full value from the land placed at their disposal and to earn a livelihood for themselves and their families by means of their various occupations if they remain underfed, sick, cachectic and tuberculous. It is urgently necessary to improve their environment.

"The Health Committee recommends :

"That the above conclusions be transmitted to the Greek Government and a copy be communicated to the Refugees Settlement Commission with the suggestion that the Commission consult the Greek Government as to the most suitable practical measures to be taken by that Government for improving general sanitary conditions;

"That, should the Greek Government so request, the Council of the League of Nations authorise the nomination of an expert of the League's Health Organisation, who would be placed at the disposal of the Greek Government for the purpose of giving technical advice in the improvement of the sanitary organisation in process of development, as well as assisting in the consultations between that Government and the Refugees Settlement Commission.

"The Committee considers that the proposals transmitted by the League of Red Cross Societies represent a programme of work to cover a long period rather than a scheme of urgent work to be undertaken forthwith. The numerous hospitals and organisations asked for are doubtless necessary, but, apart from the very great expenditure involved in building and installation, the time required for construction, the difficulty of obtaining a qualified staff, and the funds necessary for upkeep have all to be considered.

"Without ignoring the public health side of the question, which is undoubtedly of great importance, primary consideration should, perhaps, be given to its economic and social aspects and to the rapid completion of the settlement of the refugees under better conditions. The establishment of hospitals, crèches, sanatoria and homes for the insane and incurables will be sure to follow.

"The Health Committee has not sufficient information at its disposal to give an opinion on that part of the proposals which relate to health conditions in Turkey.

"(*c*) The Health Committee decides to entrust to medical men in charge of hospitals, of medical clinics and of anti-malaria ambulances stationed in malarial regions in Algeria, Spain, Italy and Roumania, and in the Kingdom of the Serbs, Croats and Slovenes, and having under treatment numerous patients presenting the different forms of malaria, the investigation on a large scale of the therapeutic value of cinchonine, other secondary alkaloids of quinquina and preparations of the total alkaloids, the investigation to be carried out fully, methodically and over a sufficient period of time.

"The Malaria Commission is charged with the preparation of an exact programme for this work and with considering the possibility of furnishing the different therapeutic agents for the investigation, with a view to the latter being carried out uniformly."

Annex 37 a.

C. 511. 1924. III.

HEALTH CONDITIONS OF THE GREEK AND TURKISH POPULATIONS EXCHANGED IN VIRTUE OF THE TREATY OF LAUSANNE

Report by Viscount Ishii, adopted by the Council on September 20th, 1924.

The League of Red Cross Societies has submitted for the consideration of the Council, through the Secretary-General, a report on the very unsatisfactory health conditions of these exchanged populations.

The Council will remember that the Health Committee, at the request of the Greek Government, sent to Greece in June 1924 an expert to examine the malaria situation in that country and to report to the Committee. This report will be examined by the Malaria Commission of the Health Committee at its session on September 24th. The observations by the Malaria Committee

on this report will be presented to the Health Committee at its third session, which opens on September 29th.

I think that it would be very advisable that the Health Committee should at the same time examine, from a technical point of view, the proposal of the League of Red Cross Societies concerning the exchanged Greek and Turkish populations. The Council would thereby obtain at an early date the technical observations necessary for any future decision which it may see fit to take.

I accordingly propose that the Council, with this end in view, should send the letter and memorandum to the Health Committee.

Annex 37 b.

C. 505. 1924. III.

HEALTH CONDITIONS OF THE GREEK AND TURKISH POPULATIONS EXCHANGED IN VIRTUE OF THE TREATY OF LAUSANNE

Memorandum by the Secretary-General, submitted to the Health Committee on October 2nd, 1924.

The Secretary-General has the honour to submit for the consideration of the Council a letter which has been received from the Director-General of the League of Red Cross Societies concerning health conditions among the Greek and Turkish populations which have been exchanged in accordance with the terms of the Treaty of Lausanne.

Attached to this letter is a copy of a report (1) by Dr. Gauthier, who was delegated by the League of Red Cross Societies to undertake an enquiry. The recommendations he makes, which were endorsed by the League of Red Cross Societies, includes the creation and equipment of a number of institutes in Greece which altogether are estimated to cost £350,000. The expenditure stated to be necessary for similar work among the Turks recently repatriated is £150,000.

The Director-General of the League of Red Cross Societies requests that the matter be referred to the Council of the League of Nations in the hope that international assistance may be forthcoming.

The Council will remember that it recently approved the suggestion of the Health Committee to the effect that, in response to a request by the Greek Government, a member of the Health Organisation of the League should carry out an enquiry on health conditions in that country at the present time. This enquiry has now been completed, and a report on the subject will be submitted for the consideration of the Health Committee at its meeting on Monday, September 27th.

Letter from the League of Red Cross Societies to the Secretary-General of the League, submitted to the Health Committee on October 2nd, 1924.

Paris, September 5th, 1924.

I have the honour to forward herewith a memorandum concerning present health conditions among the Greek and Turkish populations which have been exchanged in accordance with the terms of the Treaty of Lausanne.

I would venture to remind you that it was at the express request of the Mixed Commission on Exchanges that a health expert was delegated by us to proceed to the camps and places of embarkation, with a view to mitigating, if possible, the sufferings of the exchanged populations.

We were fortunate enough to find, in the person of Dr. Aimé Gauthier, an expert who had already worked in Greece during the whole of 1923 with the Epidemic Commission of the League of Nations, and whose character and qualifications appeared to us to furnish every guarantee.

Our expert confined himself entirely to submitting suggestions on health matters, and I would venture to summarise them on general lines.

The health conditions of a large number of the 500,000 Turks and 1,200,000 Greeks who were exchanged give rise to serious anxiety. In regard to the Greeks in particular, malaria threatens to exterminate completely a large proportion of emigrants before many years have elapsed unless immediate assistance is forthcoming.

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(1) Not reproduced.

General hospitals, dispensaries and homes for the aged and infirm should be established. In the opinion of our expert, the working capacity, and, therefore, the economic future of the populations who have been exchanged, will never reach a satisfactory standard, and these populations will be inevitably doomed to pauperism if those who are unfit are not dealt with by an appropriate organisation.

Our expert makes the suggestion that the international loan accorded to Greece should in part be employed for the amelioration of health conditions among the refugees, in default of which any material assistance which they may receive with a view to their permanent rehabilitation would lose a great part of its value.

According to available data, the total sum estimated to be necessary for assisting Greece to perfect her sanitary installations would amount to £350,000 sterling.

In Turkey, the position of the emigrants, from a material point of view—that is to say, food and lodging—will be extremely precarious during at least a year. Assistance in kind would therefore be necessary. Moreover, the heavy burden of the unfit, the aged, the infirm, chronic invalids, in particular, consumptives, forms an almost insuperable barrier to their definite rehabilitation for a long period of years. As was the case with the Greeks, it would be advisable to provide the necessary sanitary institutions to provide shelter for this part of the population and make it possible to secure the full economic yield from the work of the able-bodied adults. Again, infantile mortality is one of the most serious problems that threaten Turkey at the present time.

The total sum which would be necessary to meet these needs until the population becomes self-supporting may perhaps be estimated at £150,000 sterling.

Even if this programme cannot be fully carried out, some system of international aid for Turkey, as well as for Greece, appears to be necessary. If, in the present circumstances, some modification in the employment of the international loan accorded to Greece might provide for the more urgent needs, in conjunction with the help of the Greek Red Cross, it would seem that in Turkey—according to our expert's conclusions and in the opinion of Government circles—the body best qualified for this work of co-ordination is the Turkish Red Crescent.

The enquiry which we undertook at the request of the Mixed Commission on Exchanges, and the results of this enquiry, appear once more to show the need for rational co-operation in international schemes of assistance, and I should be extremely grateful to you if you would transmit the attached report, together with our conclusions, to the Council of the League of Nations in the hope that its powerful influence may set on foot an international movement of assistance for the unfortunate peoples on whose condition we have reported. I can assure you that our expert knowledge and administrative organisation will be entirely at your service for co-operating in the humanitarian task which may be decided upon by the Governments, for the resources which the unaided efforts of the Red Cross Societies could mobilise for the purpose would only allow us to engage palliatively on the immense task which we have been asked to undertake.

(*Signed*) Claude H. Hill,
Director-General.

Annex 38.

C. H. 255.

WORK OF THE COMMISSION ON TROPICAL DISEASES

Report by Dr. Raynaud, approved by the Committee on October 2nd, 1924.

The Commission has noted the documentary report and the recommendations of the Expert Committee on Tropical Diseases which met in London on September 4th last, as also the report submitted to this Commission by Professor Kleine on the problem of sleeping-sickness.

The enquiries of the Commission were concerned with tuberculosis—a disease which, formerly almost unknown, is at present increasing to an alarming extent—and sleeping-sickness. The latter, which in the last century was very localised, has spread owing to the constant increase in communications. It now occurs over a vast area of Equatorial Africa, causing a high mortality and a considerable diminution in the birth-rate, thus seriously threatening the existence of a whole race. Labour has become scarce, and this is having an effect on the economic development of the country.

The campaign is being conducted with energy by the various Governments, but the immensity of the infected area and the great distances which separate the various groups are serious obstacles —as against which only a small number of doctors are available.

Having carefully considered the suggestions of the Commission, the Health Committee is of opinion that the League of Nations cannot remain indifferent to the fate of the numerous peoples who inhabit this vast continent. The question is not merely one for Governments which are protectors or mandatories : it is a humanitarian duty incumbent on all civilised nations to

give their attention, for there can be no doubt that it is contact with the white races which has caused the spread of tuberculosis and that sleeping-sickness has been transmitted outside its original frontiers. Civilisation does not bring advantages only; it inevitably causes harm also, and this it should make good.

There is, first of all, a scientific aspect of the problem which is of great interest. Little is still known concerning the disease, in spite of the considerable work which has been accomplished. For instance, we do not know where the virus actually lurks, and whether it is man alone or the animals which surround him which are contagious and dangerous.

Apart from the African trypanosomiasis, there is an American trypanosomiasis. The parasite of the latter is biologically quite distinct, but in its epidemiology it presents certain points of contrast and certain points of resemblance. The comparative study of these two parallel diseases may throw some light on the problem as a whole and may make it possible in the near future to reach a wholly satisfactory solution, both from a prophylactic and a therapeutic point of view.

The Committee therefore believes that the study of these problems submitted to the Committee of Experts on Tropical Diseases should be continued and that all possible steps should be taken to improve the state of affairs referred to above.

It suggests that the Council should most carefully consider the possibility of the League of Nations co-operating to the fullest possible extent in carrying out this humanitarian and socially useful work.

Sleeping-Sickness

The Committee makes the following recommendation to the Council :

(*a*) *Administrative Measures.*

It would be desirable for the Governments of the infected countries to afford facilities for conferences between administrators and medical officers on both sides of the frontier in charge of the campaign against sleeping-sickness.

There should be co-operation in order to ascertain what zones are affected, the prevalence of the tse-tse fly, migrations and movements of the population—all factors favourable to the communication of the disease, etc.

To effect this liaison, it would be desirable to convene a conference of the representatives of the various Governments to whom the Health Committee would offer all possible assistance.

Finally, the Committee begs to draw the attention of the Governments to the value, in connection with the fight against sleeping-sickness, of a medical service proportionate to the number of the population and the extent of the districts to be inspected.

(*b*) *Technical Investigations.*

The Experts Committee has suggested that the following questions should be investigated :

(1) The existence of any human immunity against trypanosomiasis, the nature of such immunity and the factors which determine it.

(2) The comparative value, from a curative and prophylactic point of view, of trypanocidal agents, the resistance of trypanosomes to these agents and the methods by which such resistance may be modified.

(3) The function of wild and domestic animals as breeding-grounds for the virus.

(4) The relations between *trypanosomiasis gambiensis* and *trypanosomiasis rhodesiensis*.

(5) The testing of precipitines applied to the blood in the alimentary canal of the tse-tse fly.

The first two problems might be investigated by the local laboratories and the organisations against sleeping-sickness which exist in the equatorial regions.

The other problems would involve protracted work which could only be entrusted to a special mission, whose sole duties should consist in carrying out very detailed and lengthy scientific researches in connection with these subjects.

In order that the mission may prove successful, it should receive administrative assistance from all Governments concerned and should be provided with adequate funds. We think that appeal should be made to the League of Nations, to the local Governments and to the various institutions interested in the question.

If this recommendation is accepted, the Health Committee might—after consulting the technical services of the various Governments and taking into account the suggestions of the Experts Committee—submit to the Council a list of the members of this mission.

Annex 39.

C. H. 250.

YEARLY REPORT OF THE HEALTH COMMITTEE TO THE PERMANENT COMMITTEE OF THE OFFICE INTERNATIONAL D'HYGIENE PUBLIQUE : RESOLUTION ADOPTED BY THE FIFTH ASSEMBLY

Letter from the Secretary-General of the League to the President of the Health Committee, submitted to the Committee on October 2nd, 1924.

Geneva, September 27th, 1924.

I have the honour to forward herewith the text of Resolution 5 adopted by the Fifth Assembly (Annex 39 *a*) regarding the work of the Health Organisation, together with a report by Viscount Ishii (Annex 39 *b*), adopted by the Council at its meeting on September 27th, and to request that you will bring the resolution and the report in question to the notice of the Health Committee, with a view to submitting to the Council at an early date the observations thereon which the Health Committee is invited to present.

(*Signed*) Eric DRUMMOND,
Secretary-General.

Annex 39 a.

C. 528. 1924. III.

YEARLY REPORT OF THE HEALTH COMMITTEE TO THE PERMANENT COMMITTEE OF THE OFFICE INTERNATIONAL D'HYGIENE PUBLIQUE : RESOLUTION ADOPTED BY THE FIFTH ASSEMBLY

Note by the Secretary-General, communicated to the Council on September 27th, 1924.

The Secretary-General has the honour to forward to the Council the text of the following resolution adopted by the Assembly at its sixteenth meeting on September 20th :

> "The Assembly asks the Council to suggest to the Health Committee the desirability of communicating to the Permanent Committee of the Paris Office International d'hygiene publique the report setting out the questions with which the Health Committee proposes to deal (which is referred to in Article IV of the Regulations for the Health Committee), at such a date as to permit the Committee to make, before the next Assembly, any observations to the Health Committee which appear to it desirable."

In adopting this resolution, the Italian delegation made an interpretative declaration to which the delegations of Poland and Venezuela also adhered. The text of this declaration is as follows :

> "The Italian delegation accepts the amendment proposed by the Rapporteur. It also accepts the resolution as a whole, interpreted in the following sense :
> "That the report referred to shall specify the particular questions on which it would be desirable for the Permanent Committee of the Office International d'hygiene publique in Paris to make, before the next Assembly, any observations to the Health Committee which it may deem desirable."

Annex 39 b.

C. 534. 1924. III.

YEARLY REPORT OF THE HEALTH COMMITTEE TO THE PERMANENT COMMITTEE OF THE OFFICE INTERNATIONAL D'HYGIENE PUBLIQUE : RESOLUTION ADOPTED BY THE FIFTH ASSEMBLY

Report by Viscount Ishii, adopted by the Council on September 27th, 1924.

My colleagues have before them the text of Resolution 5 adopted by the Fifth Assembly regarding the work of the Health Organisation, as well as of the interpretative declaration made by the delegations of Italy, Poland and Venezuela in accepting this resolution.

I would propose that we should forward to the Health Committee the suggestion made by the Assembly, together with the minutes of the Assembly's meeting of September 20th, when the resolution in question was discussed. The Health Committee, whose third session begins on September 29th, would then be able to consider carefully the recommendation forwarded by the Council with a view to submitting a report on the matter to the Council at an early date.

I therefore propose that the Council, with this end in view, should send to the Health Committee the resolution in question, together with the minutes of the Assembly meeting of September 20th, 1924.

Annex 40.

C. H. 256.

WORK OF THE TUBERCULOSIS COMMISSION

Report by Professor Léon Bernard, adopted by the Committee on October 2nd, 1924.

A temporary Commission, under the chairmanship of Dr. Tsurumi, has made a preliminary investigation of certain questions concerning tuberculosis which have been submitted to the Health Committee. These questions are detailed in a note by Dr. Tsurumi, in a resolution adopted by the Assembly and in a recommendation passed by the International Union for the Prevention of Tuberculosis.

The following are the conclusions arrived at in the course of the discussion.

The problems discussed by the Commission belong to four categories :

1. The biological study of tuberculins : their composition, methods of preparation and varying degrees of activity.

2. Examination of the methods of diagnosis of tuberculosis, including the use of tuberculins both for diagnosis and for the estimation of immunity (the von Pirquet reaction; subcutaneous injection of tuberculin; the Mantoux intra-dermal reaction) and also the other biological processes proposed (sero-agglutination, complement fixation, etc.) and finally purely clinical methods of diagnosis.

It should be pointed out that, in order to appreciate the value of biological methods of diagnosis, the use of clinical data is indispensable.

3. Enquiry into the value of the numerous methods of treatment and preparations, including vaccines, sera and drugs which have been put forward as specific agents for either prevention or treatment.

4. The comparative study of the value of the various social measures in combating the social scourge of tuberculosis.

All were agreed that we should abstain from an investigation involving clinical research. We considered research of this nature little likely to yield results. We certainly have not the

means at our disposal of obtaining unequivocal data, which the medical profession in many countries, with greater facilities than we can command, have failed to obtain in spite of ceaseless effort.

On the other hand, the biological study of tuberculins seemed to us to fall within the competence of the Commission for the Standardisation of Sera and Biological Products, and we propose that you should ask that Committee to include this investigation in its programme. As, however, the study of the action of tuberculins in healthy or tuberculous individuals can hardly be neglected in such an investigation without incurring the risk of arriving at incomplete—not to say incorrect—data, we have expressed a desire that Dr. Tsurumi and Professor Léon Bernard should be added to the Standards Commission for the question of tuberculins.

With this sole exception, we have thought it advisable to eliminate all other medical questions, such as a consideration of methods of diagnosis.

For similar reasons we have decided to recommend the exclusion of any enquiry into methods of vaccination or treatment by specific preparations, real or alleged. Not only have we no facilities for the prosecution of such an enquiry but we are anxious to avoid the accusation that, by giving some kind of official recognition to one method or by condemning another, we are setting up an official medical science of our own under the auspices of the League of Nations. Deplorable as are the effects on public health of charlatanism, characterised as it is by so many preventive and therapeutic methods of doubtful utility, we think that the Health Committee should avoid this dangerous path.

There remain social anti-tuberculosis measures. We think that this question calls for our careful consideration.

The prevalence of tuberculosis is decreasing in a large number of countries; what is the cause of this gratifying fact? Can it be attributed to general improvement in hygiene, in housing or in feeding? Is it due to the application of the co-ordinated system of so-called "direct" anti-tuberculosis measures (dispensaries, sanatoria and special hospitals, child welfare)? Can it be attributed to an increasing immunity of civilised and infected populations?

Nobody disputes the influence of general and indirect factors on the incidence of tuberculosis. The last war furnished ample proof of this. But is that a sufficient reason for disputing the efficacy and the fighting value of direct measures?

For my part I do not think so; but the question has been put. The answers are by no means uniform. Even in the United States, where so much attention has been paid to anti-tuberculosis work, controversies are raging around this question, and curiosity has been specially aroused.

The question is of great importance, because those States which are in process of organisation, such as the Kingdom of the Serbs, Croats and Slovenes, or even those which are doubtful as to the advisability of persevering along the lines on which they have been working, are wondering whether the results of any particular method are proportionate to the financial sacrifice it entails.

It should not, however, be impossible to give a reply to this question, however complex its component parts may be.

This question, moreover, is essentially of an international character, or, more properly, it is only by a comparison of the factors met with in different countries that a solution can be hoped for.

We have considered it advisable, therefore, to ask the Secretariat to collect all available information bearing on the subject. This documentation will be essentially statistical in character, but statistical investigations applied to a question of this nature require the intervention of statistical experts who are not only thoroughly competent in their own domain but also possess expert knowledge of tuberculosis. Hence, we believe that the work of the Secretariat, temporarily strengthened by specialists, should begin on the lines indicated, and under the direction of the 1924 and 1925 Bureau, with the assistance of Dr. Tsurumi. It is hoped that a first report may be submitted to the Committee during its April session. It may then be possible to determine how the work should be pursued and to appoint a permanent commission with definite terms of reference.

Having thus cleared singularly difficult ground, and having, as has been remarked, treated the problem of tuberculosis somewhat in the manner of the classical *Peau de Chagrin*, the Commission has declared its task to be at an end, and now submits the results of its work for your consideration.

Annex 41.

C. H. 234 (1)

ACTION ARISING OUT OF THE PROPOSAL OF THE NETHERLANDS GOVERNMENT CONCERNING QUARANTINE CLEARANCE OF SHIPS

Report by Dr. Fitta, approved by the Committee on October 3rd, 1924.

As a preliminary step to the study of the questions entrusted to the Commission by the Health Committee at its last session, a letter was sent to each member of the Health Committee asking for all available information, in so far as the members' countries were concerned, in respect of

special agreements of the kind referred to in Article 41 of the International Sanitary Convention of Paris 1912, or any other agreements designed to make necessary measures of port health practice and procedure less burdensome for commerce.

Replies have been received from Great Britain, France, Italy, the United States of America, Brazil and the Netherlands; copies of these replies have been distributed to the members of the Health Committee. Further information was given verbally to the Commission by representatives of Belgium, Brazil and Italy.

No formal agreements of the kind referred to are in operation. The arrangements that have been made between the United States of America, on the one hand, and certain ports of Great Britain and the port of Amsterdam, on the other, are of interest. These arrangements provide that fumigation certificates issued by the responsible port health officers of Great Britain and Amsterdam are taken into consideration by American authorities when considering the necessity for fumigation of ships coming from the ports in question.

Details have been furnished regarding conventions or agreements which have been concluded between Italy and France, and between Brazil, Argentine, Paraguay and Uruguay; these are of considerable interest, but, as neither convention has been put into operation, it is impossible to say how they would work in practice. The most interesting feature of the South American agreement relates to the formation of a service of maritime sanitary inspectors and to the facilities that should be accorded the vessels carrying on board a member of such a service. This suggestion had already been brought to the notice of the Provisional Health Committee by Dr. Chagas.

At the present time, when epidemics of dangerous communicable disease appear in any of the ports of the four South American countries referred to, a qualified maritime sanitary inspector is placed on board any vessel leaving that port for any other port in any of the four countries. The inspector can keep the ships' complement under close observation during the voyage. The resultant advantages to public health from such a procedure and the simplification of port health procedure that it entails are worth close study by all countries where conditions render the application of similar measures practicable. The scheme entails the formal recognition of the medical officers of one country by another.

The Commission considers that mutual agreements between two or more adjacent countries, or countries possessing similar public health interests, which are in close maritime communication, having as their object the prevention of needless repetition of sanitary measures taken against ships prescribed or permitted by international sanitary conventions, might be of great benefit. It further considers that, given mutual confidence in port health administration and sufficient similarity of port health procedure of the contracting parties, a certain number of such agreements might now be negotiated. If, for example, model clauses for such an agreement be prepared, M. Velghe and Dr. Jitta each expressed his willingness to submit them for the sympathetic consideration of his Government.

In any such model clauses the question of fumigation of ships for rat destruction would find a prominent place. The Commission proposes to draft such clauses for consideration as soon as practicable.

It is in no wise suggested that such partial agreements should replace the International Sanitary Convention about to be revised; on the contrary, they will be designed to simplify and facilitate the working of the International Convention. They will possess a further advantage, in as much as, being based on mutual confidence, they can afford to allow greater latitude and give more facilities than can a convention designed for universal adoption.

The Commission has had under consideration the resolution adopted by the Sub-Committee for Ports and Maritime Navigation of the Advisory and Technical Committee for Communications and Transit of the League of Nations at its session in London in July 1924. The Commission proposes that the Health Committee, in acknowledging the receipt of that communication, should express appreciation of the offer of collaboration and state that when the discussion of the important matters referred to is a little further advanced it will be very glad to avail itself of the offer.

Annex 42.

C. H. 247.

WORK OF THE CANCER COMMISSION

Report by Sir George Buchanan, adopted by the Committee on October 3rd, 1924.

1. The Cancer Commission, having met immediately before and during the present session, begs to submit the following report for the consideration of the Health Committee.

2. The questions referred to the Commission, and the lines on which it has been requested to pursue its work, were fully discussed by the Health Committee as recently as February last. Reference should be made in this connection to the minutes of the first session of the Health

Committee (pages 46-52 and 71) as well as to Annex 9 to the same minutes (page 118). Here we may quote the following paragraphs from the resolution which the Health Committee adopted on that occasion :

> 3. "The Health Committee . . . . . considers that it is desirable to appoint a commission on cancer which should be charged with the duty of considering and advising on questions on which it appears that co-ordinated action in different countries for the investigation of the problem of cancer in any aspect can be most effectively obtained through the Health Organisation of the League of Nations;
>
> "In view, on the one hand, of the wide terms of this reference, and, on the other hand, of the financial and practical considerations which must be taken into account, the commission will be instructed to limit investigations which involve charges on the budget of the Health Organisation to matters which have previously been carefully defined and for which a practical programme has been previously approved by the Health Committee;
>
> "The Health Committee, considering that, from this point of view, the comparative enquiry into the causes of the disproportionate mortality from certain forms of cancer in Great Britain, the Netherlands and Italy is a matter of great importance, and one which requires action by the Health Organisation to be effectively carried out, and in view of the preparations for such investigation which have been so fully and carefully worked out by the Sub-Committee of the Provisional Health Committee, decides to instruct the Commission, as its first task, to continue its investigations and to report the results as early as possible.
>
> "For these reasons, the Health Committee decides to appoint a cancer commission composed of Sir George BUCHANAN (Chairman), Dr. LUTRARIO, Dr. JITTA, Professor Léon BERNARD and Dr. CARRIÈRE.
>
> "The first duty of this commission will be to examine reports by Sir George Buchanan, Dr. Lutrario and Dr. Jitta on the continuation of the work undertaken by the former Cancer Sub-Committee, with a view to discovering, by comparing the statistics of Great Britain, Italy and the Netherlands, the cause of the difference shown to exist between the mortality returns of these countries in respect of cancer of the uterus and of the breast.
>
> "The Cancer Commission is empowered at a later stage to extend its investigations into the epidemiology of cancer in general, as far as circumstances will permit. "

4. *Part 1. Progress of the Differential Study undertaken in Great Britain, Italy and the Netherlands regarding the Causes of the Different Rates of Mortality from Certain Forms of Cancer in those Countries.*

Study of the discussion at the meeting of the Health Committee in February, and the explicative memorandum in Annex 9, to which reference has just been made, will show that the Health Committee realised from the outset that the investigations required in each of the three countries would necessarily be of some duration. The co-operation of many workers in each country had to be secured, and a mass of special data, not at present available, had to be obtained. The work had to be undertaken in each country according to the methods which are most convenient and practicable in the circumstances of that country. And it was also necessary to keep constantly in mind that the object of the enquiry is to obtain material which admits of comparison between the three countries, and consequently that frequent consultation and decisions on methods are required in order that the information ultimately obtained may permit of a satisfactory comparison, and so to elucidate the problem before the investigators.

5. These primary necessities of the investigation are being realised in practice. The groups of investigators in each country have followed the main lines which were laid down in February, and they have not neglected any opportunity of comparison and co-ordination of their results. They have done this partly by correspondence and what may be termed minor conferences, and also by means of a more formal conference of investigators, at which all three countries were represented, which was held in Rome in May.

6. The Commission desires to record its obligations to Dr. Jitta for presiding at this conference, and in special measure to Dr. Lutrario, who secured for the visitors the invaluable assistance of the official services of his country as well as the collaboration of distinguished members of the medical profession in Italy.

7. One document relating to the Rome meeting has already been circulated to the Health Committee, viz : Doc. C. H./Cancer/V. A., of September 5th, 1924. This gives in three pages those conclusions of the conference which specially affected the work of the statisticians, and were formulated in resolutions.

8. In addition, minutes have been prepared of the Rome Conference with certain Annexes (Doc. C. H./Cancer/V., of June 30th, 1924). These minutes have not so far been distributed to the Health Committee as a whole. They give the basis on which the statisticians arrived at the resolutions just referred to, and in addition record the result of an exchange of experience between the workers who are obtaining the information which it has been decided to obtain in each country (at hospitals and elsewhere) by predetermined questionnaires. The document is of further value through the fact of its incorporating some special contributions from Italian experts.

9. During the present session the Commission has received three further memoranda, submitted by Dr. Lutrario, Dr. Jitta and Sir George Buchanan respectively, on the present position

of the work in Italy, the Netherlands and Great Britain. The last mentioned of these three memoranda has already been circulated to the Health Committee as document C. H./220 of August 25th, 1924, and the other two will be in the hands of members before the end of the session.

10. It is perhaps unnecessary to observe that, from the nature of the enquiry and in view of the short time that has elapsed, no judgments or comparisons can yet be put forward from the data thus furnished. It has been settled that certain definite lines of enquiry should be followed in all three countries, but it will not be expected that at the same moment, and in the middle of the investigation, these different enquiries will have advanced to the same stage in every country. The reader, for example, who is struck with some observation which he finds in the Italian memorandum must not necessarily expect at this stage to find corresponding observations in the memorandum for Great Britain or the Netherlands, but he may none the less be assured that the primary object of securing comparable data as soon as possible is not being lost sight of.

11. In this connection the Commission is united in the opinion that it would greatly facilitate their work if certain of the documents now available can be printed, though we do not propose that they should be published or placed on sale. It will be remembered that this course was followed in dealing with the original programme of the Provisional Health Committee, and we are satisfied that a great deal of time and explanation can be saved by the distribution of these reports to the numerous workers who are assisting in the investigation. We believe also that the proceeding we suggest would be useful to members of the Health Committee and to others who are specially interested in following the different stages of our enquiry. The papers to be thus printed, after any practicable condensation, should include the Minutes of the Rome Conference, the three memoranda just referred to, and the present report.

12. We would suggest the addition to these papers of a further note (Annex 42 *a*) which has been supplied to us by Dr. Eichel regarding the different rates of mortality from cancer in New York, Philadelphia and certain other American areas (1). It will be remembered that the choice of the three countries for investigation was largely determined by the notable differences in the mortality from certain forms of cancer presented by Great Britain (the highest rate), the Netherlands (intermediate rate) and Italy (lowest rate). It would appear from the figures extracted from the United States census, to which Dr. Eichel has drawn our attention, that similar and conspicuous differences are observed among the foreign population of certain American towns according as the nationality of the mother was British, Dutch or Italian.

13. Pending the study of these documents by the Health Committee, we may illustrate in a few words how the investigations stand at the moment by separate reference to some of the branches into which the investigations are divided.

14. (*a*) *Demographic Enquiry.* — This is the enquiry which has been confided to the statisticians and is being conducted by them on the lines of the resolutions of the Rome Conference. The enquiry comprises the study and comparison of national statistics, from various aspects, to see what relation exists between the deaths from mammary and uterine cancer and the deaths from all forms of cancer, and the deaths from all causes. It seeks to determine differentially as between the three countries, the influence of age distribution, civil state, child-bearing, and other factors. Account is also being taken of the conspicuous regional differences in mortality in each country, and similar questions.

Our statistical experts propose to co-ordinate their results and observations (some of which have involved very laborious work) at a meeting to be arranged towards the end of the present year. Meanwhile, they continue in correspondence with one another, and are organised as a special sub-committee, of which Dr. M. Greenwood is Chairman, and Dr. Eichel, Secretary.

(*b*) *Correspondence between the Records of Death in the Three Countries.* Several investigations bearing on this question are already advanced. We may refer in particular to the note contributed by Professor Methorst in the annex of the Minutes of the Rome meeting, as well as to observations in the British memorandum (Doc. C. H. 220, pages 3-5), and to the Italian memorandum (page 3). The question whether, or to what extent, the differences in mortality which we are seeking to explain are real differences, as opposed to those which might be created by different practices of certifying and recording causes of death, is naturally of primary importance.

(*c*) *Comparison of Facts as to Operative Treatment in the Three Countries.* — The investigators are giving considerable attention to two possibilities, viz : that the countries in question may differ substantially :

(1) in the extent to which patients undergo operative treatment;

(2) in the stage of the disease at which on an average operations are undertaken.

At first sight it would seem an easy matter to determine these two points in any country. In fact it has proved a matter of some difficulty, and special enquiries have had to be devised to obtain the information. In the Netherlands, for example, special arrangements have been made for the collection of information as to operation in the case of cancer in the breast and uterus from members of the medical profession. In England and Wales, another line of enquiry has been followed, which is set out on pages 5-9 of the English memorandum. It may be mentioned that the English memorandum gives a provisional indication that in that country about one-third of the deaths due to cancer of the breast have never been the subject of any operative

(1) Doc. C. H. 248.

treatment at all, while, as regards the remaining two-thirds, evidence has been obtained that the interval between the discovery of the growth and operation, as well as the interval between first consulting a doctor and operation, have both on an average been most undesirably long. As the enquiry proceeds, it is hoped that the experience of all three countries in these respects will be available for conclusions.

(*d*) *Hospital Enquiries.* — The purpose of these enquiries, which have been made on the lines of a questionnaire proviously settled, is to throw light on the presence of factors such as antecedent injury, lastitis, lactition, labour and pregnancy conditions, as well as facts regarding age, race, and the like. The object here is to see whether any of these factors, provided they influence the occurrence of cancer, are found to a greater extent in the hospital series of one country than in another. Good progress is being made in this work in all three countries.

15. Subject to the approval of the Health Committee, we propose to continue these enquiries and to determine from time to time, in consultation with the President and with the Medical Director, the occasions which seem convenient for meetings to take stock of the different investigations just enumerated. The next occasion for doing so may perhaps be the holding of the conference of statisticians referred to in paragraph 5. Alternatively, it may be found more convenient for the next collective study to be undertaken independently of the special statistical enquiry.

16. We should perhaps add to this report a reference to the expenditure of the sum which was allowed for the cancer investigation in the budget for 1924. It will be remembered that this sum was kept within the lowest limits which seemed compatible with the promise of useful results, and the Commission is happy to find that it has so far been possible to undertake the work above described without exceeding the rate of expenditure allotted for 1924. This experience suggests that the continuation of the work during next year, which will evidently be requisite, need not demand any greater rate of expenditure in 1925 than that which has been allowed for 1924.

17. The payments made have, in general, been of the nature of honoraria in return for important services and assistance, much of which must really be regarded as having been placed voluntarily at the disposal of the League.

Part II. Future Extentions of Cancer Investigations.

23. The Commission has not been unmindful of the direction which is contained in its reference that it should, at the appropriate time, consider other and wider aspects of the cancer problem. It suggests for the consideration of the Health Committee that, pending completion of the present enquiry, a useful step might be taken to enable epidemiologists, research workers, clinicians and other interested to bring new facts regarding different aspects of the cancer problem to the notice of the Health Organisation. It would suggest that the several members of the Health Committee and of the Advisory Health Council might be invited to suggest the name of a cancer correspondent for each country, the correspondent undertaking voluntarily the duty of sending information to the Health Organisation regarding new publications or researches which may seem to have an interest for the work of the Commission, either now or in the near future. The receipt of any such communications from correspondents could then be notified by the Medical Secretariat, not only to members of the Cancer Commission but also to any members of the Health Committee who express a desire to receive them. In this connection, the Commission would refer with much appreciation to an important memorandum relating to cancer in Switzerland which Dr. Carrière has been so good as to forward during the session.

Annex 42 a.

C. H. 248.

WORK OF THE CANCER COMMISSION

Memorandum by Dr. Eichel on Cancer Mortality in the United States by Country of Birth of Mothers of Decedents, submitted to the Committee on October 3rd, 1924.

Geneva, September 28th, 1924.

It is desired to bring to the attention of the Cancer Commission certain data on this subject which appear in the volume entitled "Mortality Rates 1910-1920", published in 1923 by the Bureau of the Census of the United States Department of Commerce.

In the text of this report, under the subject of cancer, are given figures showing the rates of mortality by age and country of birth of mothers. From these it appears that the lowest rates, for white males and females combined, in several States and cities for which tabulations are presented for 1920, are for those of mothers born in Italy. Referring to all the cancer rates, the report states : "The rates for those of mothers born in Italy are lower than any other rates

shown by country of birth of mother". The observation is also made that in 1900 in the death rates of the city of Boston for cancer, those of mothers born in Italy were comparatively low. During 1920 in four areas (City of New York, State of New York, Chicago City and Philadelphia City) the highest cancer mortality for both sexes combined, adjusted for age and sex, is for those of mothers born in Ireland, while in Pennsylvania it is highest for those of mothers born in England-Wales-Scotland. The adjusted and the crude rates, for both sexes combined, of mothers born in Italy are the lowest in three areas which show rates for 1920 for this race-stock, namely, New York City, New York State and the State of Pennsylvania, in which the adjusted rates are respectively 60.4, 61.0, 57.8 per 100,000 enumerated population. The highest adjusted rate in Pennsylvania State in 1920 was 99.2 for those of mothers born in England-Wales-Scotland, and it was also much higher for them in New York State and New York City than for those of Italian-born mothers. Hence it may be inferred that cancer death rates for those of mothers born in the Netherlands may possibly be found lying between those of British and Italian-born mothers.

In 1920, among the areas for which the statistics are presented in this census report, *for females* of mothers born in England-Wales-Scotland, the highest rate existed in New York State, namely, 189.4, and the lowest in Pennsylvania State, namely, 180.0. But the highest rate for females of mothers born in Italy, namely 46.6, existed in New York City and was only about one-quarter as high as the lowest rate for those of mothers born in England-Wales-Scotland.

For females the lowest rates are for those of mothers born in Italy (36.1 in Pennsylvania) and the highest are for those of mothers born in Germany (227.1 in New York City) and next of mothers born in Ireland (215.7 in New York State).

Further details giving rates by age etc. will be found in the text in this report, pp. 80 *et seq.*

Further effort is being made to obtain for the Cancer Commission more detailed information from other publications of the United States Census Office which are not at present available in Geneva.

Annex 43.

C. H. 258. C. C. T. 152.

MODEL CONVENTION FOR THE HEALTH SUPERVISION OF TRAFFIC OVER NAVIGABLE WATERWAYS

Adopted by the Mixed Sub-Committee of the Committee for Communications and Transit and the Health Committee, and submitted to the Health Committee on October 3rd, 1924.

PART I.

Chapter I — General Provisions

Article 1. — The High Contracting Parties undertake to apply the regulations of the present Convention to all traffic over the navigable waterways enumerated below.

The navigable waterways to which the present Convention shall apply are :

. . . . . .

Article 2. — The High Contracting Parties shall endeavour, in applying the regulations of the present Convention, to reconcile the needs of health supervision with the interests of commerce by reducing to a minimum any obstacles which may be placed in the way of free navigation.

Chapter II. — Supervisory Organisations. Health Arrangements. Notifications of Disease.

Section I. — Supervisory Organisations.

Article 3. — The health supervision on navigable waterways forming the object of the present Convention shall be exercised by each of the High Contracting Parties within its own territory through its own Public Health Department.

In cases where an international body duly qualified from the sanitary point of view has been or is to be established over these waterways, this body may provide for the execution of the measures laid down in the present Convention.

Article 4. — Subject to paragraph 2 of Article 3, the representatives of the Public Health Departments of the States concerned shall meet at least once a year at a place to be selected by common agreement on each occasion, in order :

(*a*) to preserve the necessary co-ordination and unity of action;
(*b*) to ensure the smooth working of the health service.

Section II. — Exchange of Health Information.

Article 5. — The High Contracting Parties undertake to communicate directly to each other through their respective Public Health Departments all useful information as to the health conditions in their respective countries; these communications shall be made in a regular and periodical manner.

Section III. — Notification of Cases of Cholera, Plague, Typhus, Relapsing Fever, Dysentery, Smallpox and Influenza.

Article 6. — In addition to the communications mentioned in Article 5, the High Contracting Parties undertake reciprocally to give immediate notice of :

(*a*) the first appearance of plague or cholera certified in the territory of each of the States concerned;

(*b*) any epidemic centres of typhus, relapsing fever, dysentery or smallpox in their respective territories;

(*c*) any appearance of infuenza of an epidemic character.

Article 7. — The notification referred to in the preceding article shall include circumstantial details, more especially regarding the following points :

1. The places at which the disease appeared;
2. The date of the appearance and clinical form of the disease;
3. The number of cases established;
4. In the case of plague, whether there is an abnormal mortality among rats;
5. What immediate measures have been taken.

Article 8. — The notifications and exchange of information provided for in Articles 6 and 7 should be followed at regular intervals by further communications.

PART II. — ORGANISATION OF PREVENTIVE HEALTH MEASURES AND SUPERVISION

Chapter I. — Vessels

Article 9. — It is desirable that vessels should be provided with :

(*a*) arrangements to ensure cleanliness on board;

(*b*) 1. drinking-water tanks of sufficient size, which can be kept free from all contamination, and which are fitted with suitable appliances for distribution; 2. latrines with portable or fixed receptacles in which excrements can be disinfected before they are emptied;

(*c*) a sufficient supply of disinfectants (as indicated in Appendix 1).

Article 10. — It is desirable that instruction should be given to the crews of vessels and rafts on the important part played by navigable waterways in the propagation of infectious diseases. This instruction should be given :

(*a*) by elementary courses explaining the rudiments of hygiene (particularly the danger of drinking the water of navigable waterways), the most characteristic symptoms of the principal infectious diseases and the prophylactic measures to be taken against them;

(*b*) by distributing booklets and leaflets containing instructions and advice regarding precautions to be taken by individuals against infectious diseases.

Chapter II. — Health and other Prophylactic Establishments

Article 11. — The High Contracting Parties undertake to provide immediately, while conditions are normal, for the organisation of special health stations along the navigable waterways which are the subject of the present Convention.

It is desirable that, while conditions are normal, joint health stations should be organised at the frontiers and that, in the case of navigable waterways which form frontiers, the distribution of inspection stations should be decided upon by common agreement.

Such health stations :

(*a*) shall be provided with a specially trained staff (medical and subordinate) and with prophylactic appliances proportionate to the volume of traffic;

(*b*) shall be placed along the navigable waterways at suitable intervals. It is desirable that vessels should be inspected at least once in every twenty-four hours.

Article 12. — The existence of health stations shall be shown by the following signs set up in such a way as to attract attention :

(*a*) notices with the inscription : "Health Inspection Station";

(*b*) by day a yellow flag, and by night two lights, one [colour], and the other [colour], both at the same distance above the ground.

Article 13. — Health stations of all degrees of importance shall be supplied with :

1. An inspection room;
2. A shower-bath room.

They shall also contain :

1. Disinfection and delousing rooms;
2. A temporary or permanent isolation ward for persons suffering from infectious diseases, unless they are in easy communication with similar services.

Every health station should be in touch with a bacteriological laboratory.
Health stations shall further be supplied with :

(*a*) drinking water for renewing the supplies of vessels;
(*b*) boxes for the transport of samples of drinking water;
(*c*) boxes for the transport of pathological material;
(*d*) disinfectants;
(*e*) appliances for destroying rats.

There should also be attached to every health station a pit in which excrements and bilge-water from vessels calling at the health station may be deposited and destroyed or rendered innocuous.

Article 14. — The High Contracting Parties undertake to provide, at convenient intervals, stations for the supply of drinking water to vessels.
The location of these stations shall be indicated by the following signs so set up as to attract attention :

(*a*) notices with the inscription : "Supply of drinking water";

(*b*) by day, a [colour] flag, and by night two lights, one [colour] and the other [colour], both at the same distance above the ground.

Article 15. — Each of the High Contracting Parties shall have a special map provided for the navigable waterways or parts of navigable waterways forming the subject of the present Convention. These maps shall show health supervision stations, disinfection stations, isolation hospitals for persons suffering from infectious diseases, bacteriological laboratories for the use of health stations, stations for the supply of drinking water, etc.
These maps shall be transmitted by each State to the other signatory States.

PART III. — METHOD OF WORKING

Chapter I. — General Provisions

Article 16. — The High Contracting Parties undertake to take the necessary measures, even in normal times :

(*a*) for vessels to be cleared of rats at least every six months;
(*b*) for the periodical disinfection of bilge-water.

Article 17. — As soon as non-imported cases of plague or cholera appear, or the existence of epidemic centres of typhus, relapsing fever, dysentery or smallpox is established, in the basin of any of the navigable waterways forming the subject of the present Convention, the competent Health Authority shall forthwith establish health supervision on navigation in the sector or sectors affected.
The High Contracting Parties undertake to notify one another immediately of any sector or sectors in which they have established health supervision.

Article 18. — In conformity with Articles 5, 6 and 7, the High Contracting Parties undertake not to consider a sector as infected or to declare a sector infected when it is situated in the territory of another Contracting State unless the latter should make a formal declaration to that effect.

Article 19. — The object of the steps to be taken ashore in infected sectors shall be :

(*a*) to prevent the embarkation of persons showing symptoms of any of the infectious diseases mentioned in Article 6 and of individuals in the immediate company of such sick persons if those individuals may reasonably be regarded as capable of transmitting the disease;

(*b*) to prevent the exportation of goods or any other objects which may be regarded as infected, in accordance with the International Health Conventions in force, and which have not previously been disinfected ashore under the supervision of the medical officer appointed by the Public Health Authorities;

(*c*) in case of plague to prevent rats from going on board or ashore.

Preventive vaccination is recommended in the case of passengers, crews, all persons employed in health supervision, and all officials and employees whose duties bring them into direct contact with the vessels or their crews.

Article 20. — The object of the steps to be taken on board vessels in affected sectors should be :

(*a*) to investigate the state of health of persons on board (passengers and crew);

(*b*) to isolate persons suffering from any of the infectious diseases referred to in the present Convention;

(*c*) to place contacts under medical observation, in accordance with the provisions of the International Health Conventions;

(*d*) to place under medical observation other persons disembarking who may be indicated to the competent authorities of the place of destination;

(*e*) to enforce the execution of the provisions of Article 9;

(*f*) to carry out disinfection, destruction of rats and vermin.

Article 21. — A health certificate on the model given in Appendix 2 shall be delivered to all persons liable to any of the sanitary measures provided by the present Convention who may apply for it. This certificate shall be duly filled in or completed by the Health Authority or Authorities which shall have applied the same measures.

This certificate shall be compulsory for all persons placed under medical observation and shall be valid as a medical passport in countries where such a passport is required.

Article 22. — As soon as the sanitary supervision is put into force, every vessel coming from affected sectors shall be furnished by the nearest health station with a bill of health on the model given in Appendix 3, unless it is already provided with one. The bill of health shall include a record of all observations regarding the hygienic condition of the vessel and shall indicate the health measures to which it has been subjected.

Article 23. — The expenses occasioned by sanitary supervision shall be borne by the States concerned. Any taxes which may be imposed in this respect on navigation must be kept within reasonable limits.

Chapter II. — Special Provisions.

A. *Cholera.*

Article 24. — If there are persons on board showing symptoms of cholera, the following special steps shall be taken :

(*a*) The vessel shall be isolated. This isolation shall cease only when the measures contained in (*b*), (*c*) and (*f*) shall have been carried out.

(*b*) Any persons infected or suspected of being infected shall be immediately disembarked and isolated.

(*c*) Persons who are suspected of having been exposed to infection on board shall be placed under medical observation during a period of five days. The Health Authorities shall, in consideration of the state of the vessel and of local conditions, determine whether the medical observation is to be carried out on board or on shore.

(*d*) All other persons shall be placed under medical observation during a period of five days reckoned from the moment when the various prophylactic measures were taken.

(*e*) Bacteriological examinations shall be conducted as far as may be considered necessary, provided that the period of five days is not exceeded.

(*f*) Any parts of the vessel and any objects which may be considered to be contaminated shall be disinfected.

Article 25. — If there are no persons showing symptoms of cholera on board a vessel coming from an affected sector, all persons disembarking from this vessel shall nevertheless be kept under medical observation during a period of five days, reckoned from the date the vessel sailed from the last port at which it called in the affected sector.

B. *Plague.*

Article 26. — If any persons on board show symptoms of plague, the following special steps shall be taken :

(*a*) The vessel shall be isolated. Such isolation shall continue until the measures referred to in (*b*), (*c*), (*e*) and (*f*) have been carried out.

(*b*) Any persons infected or suspected of being infected shall immediately be disembarked and isolated.

(*c*) Persons who may be considered to have been exposed to infection on board shall be placed under medical observation for five days. The Public Health Authority shall determine whether such medical observation shall be carried out ashore or on board, having due regard to the conditions on board the vessel and local facilities.

(*d*) All other persons shall be placed under medical observation for five days, reckoned from the time at which the various prophylactic measures were carried out;

(*e*) All rats on the vessel shall be destroyed. The Public Health Authority shall determine whether the operation is to be carried out before or after the unloading of the cargo.

(*f*) Parts of the vessel and objects which may be considered to be contaminated shall be disinfected.

Article 27. — Even if no person showing symptoms of plague is discovered on a vessel coming from a plague area, all persons disembarking from the vessel shall be placed under medical observation for a period of five days, calculated from the time at which the vessel left its last port of call in the affected area.

In the event of an abnormal mortality occurring among the rats on board, the measures prescribed in paragraphs (*d*), (*e*) and (*f*) of Article 26 shall be carried out.

C. *Typhus and Relapsing Fever.*

Article 28. — If any persons on board show symptoms of typhus or relapsing fever, the following special steps shall be taken :

(*a*) The vessel shall be isolated. Such isolation shall continue until the measures referred to in (*b*), (*c*) and (*d*) have been carried out.

(*b*) Persons who are infected or suspected of being infected shall be immediately disembarked, deloused and isolated.

(*c*) Persons who may be considered to have been exposed to infection on board, including persons who are not in a satisfactory condition from the point of view of hygiene, shall be deloused and placed under medical observation for 12 days reckoned from the date of disembarkation.

(*d*) Any parts of the vessel and any objects which may be considered to be contaminated shall be subjected to disinfection and disinsectisation.

E. *Dysentery.*

Article 29. — If any persons on board show symptoms of dysentery, the special measures referred to in (*b*) and (*c*) of Article 24 shall be applied.

F. *Smallpox.*

Article 30. — If any persons on board display symptoms of smallpox, the following special measures shall be taken :

(*a*) The vessel shall be isolated. Such isolation shall continue until the special measures referred to in (*b*), (*c*) and (*d*) shall have been carried out.

(*b*) Persons who are infected or suspected of being infected shall be immediately disembarked and isolated.

(*c*) Persons who may be considered to have been exposed to infection on board and who, in the opinion of the health authorities, are not adequately protected by recent vaccination or by a previous attack of smallpox may be required to undergo vaccination or may be placed under medical observation for a period of 14 days reckoned from the date of disembarkation.

(*d*) Any parts of the vessel and any objects which may be considered to be contaminated shall be disinfected.

PART IV. — GENERAL PROVISIONS.

Article 31. — All information which must, in conformity with Articles 5, 6, 7, 8 and 15, be communicated by each High Contracting Party to the other signatories shall be transmitted simultaneously to the Health Section of the League of Nations.

The Public Health Departments of the High Contracting Parties shall also transmit to the Health Section of the League of Nations at the end of each year a report concerning the working of the Health Supervision Organisation for the various navigable waterways referred to in the present Convention.

Article 32. — The High Contracting Parties undertake to submit any disputes which may arise between them concerning the interpretation or application of the present Convention for an advisory opinion to a mixed organisation of representatives of the League of Nations Health Committee and the League of Nations Advisory and Technical Committee for Communications and Transit before submitting them to any judicial body.

Appendix 1.

LIST OF DISINFECTANTS WITH WHICH VESSELS MUST BE PROVIDED.

1. Quicklime.
2. Cresol.

N. B. — The amount of each of the disinfectants referred to shall be fixed by the Public Health Authorities concerned. Such amount must, in any case, be sufficient for all requirements for at least 48 hours.

It is understood that the object of prescribing the above disinfectants is not to prohibit the use of any other disinfectant the value of which is more highly esteemed by the signatory States.

Appendix 2.

HEALTH CERTIFICATE TO BE DELIVERED TO EVERY PERSON DISEMBARKING (CREW OR PASSENGERS)

Sanitary Station at .....

I, the undersigned, Medical Officer of Health, declare that Mr. .....
.....travelling on.....
who has arrived on the.....of .....
and has stated that he is proceeding to.....

* has been isolated for.....days.

* has been placed under medical observation for .....days.

* has been vaccinated against..... on .....

* has had his baggage { disinfected on.....
disinsectised on.....

* will be required to remain under medical observation for.....days.

Date ..... (*Signed*) .....

Medical Officer in charge
of the Sanitary Station.

---

(1) Cross out any portion which is inapplicable to the case.

Appendix 3.

BILL OF HEALTH

(*First page of the Booklet.*)

Country .....

Bill of Health No.....for the Health Supervision of International Traffic on Inland Waterways.

Class of vessel*.....flying..... flag.

Name .....

Distinctive marks (letters, etc.) .....

Number .....

Tonnage .....

Owned by.....domiciled at.....

Name of master.....resident at.....

Waterways used by the vessel.....
.....
.....
.....

Remarks (if any).....

Issued at.....on..... (date).

Master of vessel :
.....

Authority by whom the Bill of Health is issued :
.....

---

(1) Indicate whether steamer, tug, tartan, large or small boat, motor-boat, etc.

(*Back of the Booklet.*)

Latrines
- (*a*) Portable
  - Number.....
  - System.....
  - Position.....
- (*b*) Fixed
  - Number.....
  - System.....
  - Position.....

Tanks for drinking water
- Number.....
- Capacity.....
- System and materials employed in construction.....
- System of distribution.....

Disinfectants with which the vessel is provided
- Quicklime..... kilos.
- Cresol..... litres

Protective appliances with which the vessel is provided against rats
- System.....
- Number.....

Rat-traps with which the vessel is provided
- System.....
- Number.....

Seen on.....

(*Leaf of the Booklet.*)

Series No.....

Inspection N.o.....

Health Supervision Station at.....

Waterway.....

Number of persons on board.....

Last port of call.....

Next port of call.....

Sanitary measures applied by the Health Stations, and remarks (if any)
- .....
- .....
- .....
- .....

The next inspection will take place at the Health Station at .....

.....

Medical Officer in charge of the Sanitary Station.

(date).....

Annex 44.

C. H. 239.

INTERNATIONAL INVESTIGATION INTO THE QUESTION OF DISINFECTION

Proposal by Dr. Chodzko, adopted by the Committee on October 3rd, 1924.

According to information received from a number of countries (Denmark, Switzerland, Germany, Russia, etc.) the question of the application of disinfection is at present passing through a crisis. Almost everywhere it is found that the old methods of disinfection and the official regulations based upon those methods are no longer keeping pace with modern science. The experience of the world-war has clearly shown the uselessness, if not the harmful effect, of certain methods of disinfection that were regarded before the war as absolutely reliable, and has proved that much simpler and cheaper means could be adopted to obtain effective disinfection.

The question of restricting the application of final disinfection and of perfecting methods of summary disinfection is at present being carefully considered in the different countries, and opinion is still very divided upon this important problem.

Several Governments, however, have already begun to carry out reforms — for example, the Prussian Government, which has revised the whole body of regulations regarding disinfection and has recently issued a new set of regulations; and the Danish Government, which is at present subjecting the regulations in force to thorough revision. Certain Swiss cantons (Zurich, for example) are also finding it necessary radically to reform their regulations on the subject of disinfection; the Eastern European countries are considering the question of introducing disinfection regulations in their health legislation. It seems to be quite clear that the question of revising present methods of disinfection is of great scientific, economic and social importance, and it would clearly be desirable to spare peoples, countries and districts the numerous and heavy burdens which these methods involve.

I therefore consider it essential that an effort should be made to supply the Health Organisation of the League of Nations, which is always so attentive to the requirements of science and health and is inspired by true humanitarian feeling, with data concerning current proposals for the improvement of existing methods of disinfection in the various countries in order that it may be in a position to form an opinion on this serious question, and communicate such opinion to any Government that may desire to obtain advice before proceeding to revise or draw up official regulations on the subject of disinfection.

Such action would appear to be all the more urgently required because, as I have already mentioned, many countries have become convinced that it will be necessary for them to revise their disinfection regulations at the earliest possible date.

I therefore venture to ask the Health Committee to adopt the following resolution :

> "The Health Committee invites the Medical Director to take the necessary steps to collect, as soon as possible, data regarding the present state of the application of disinfection and the texts of the disinfection regulations in force in the different countries, such data to be used as the basis for a general report to be submitted to the Health Committee."

C. 573. 1924. III.
(C. H. 257. 1924).

Annex 45.

REPORT ON THE WORK OF THE THIRD SESSION OF THE HEALTH COMMITTEE

Held at Geneva from September 29th to October 4th, 1924.

I.

In accordance with the Rules of Procedure, the Health Committee elected Professor Léon BERNARD and Dr. Alberto LUTRARIO Vice-Presidents, to hold office for twelve months as from January 1st, 1925.

II.

By its resolution of September 27th, 1924, the Council of the League decided to refer to the Committee the fifth resolution of the Fifth Assembly regarding health questions and requested the Committee to give careful consideration to the recommendation transmitted by the Council with a view to submitting a report on the subject with the least possible delay.

The Committee, after an exhaustive discussion, decided to submit the following report to the Council :

"The Health Committee has given careful attention to the recommendation adopted by the Assembly during its present session and in which the suggestion is made that it would be desirable for the Health Committee to communicate to the Permanent Committee of the Office international d'Hygiène publique the annual report setting out the questions with which the former body proposes to deal, at such a date as to permit the Permanent Committee of the Office to make, before the next Assembly, any observations to the Health Committee which appear to it desirable.

"It seems to us that the end which this recommendation is intended to secure will be easily attained as a result of the close and continuous relations which have been established between the Health Committee and the Health Section of the Secretariat on the one hand and the Office international d'Hygiène publique on the other.

"It should not be forgotten that the close collaboration between the two Committees is the result less of the administrative communication of documents than of the actual composition of the Health Committee.

"As a result of the agreement which was drafted by a Mixed Commission of delegates from the two bodies, and ratified by the Assembly on September 15th, 1923, the Health Committee comprises, in addition to the President of the Permanent Committee of the Office, nine members chosen by that body, of whom, as a matter of fact, eight are actually members of the Permanent Committee of the Office international. Under the terms of the Rules of Procedure of the Health Committee, the President of the Permanent Committee of the Office is *ex officio* a Vice-President of the Health Committee. Finally, the Council of the League of Nations, which has the right to nominate six members of the Health Committee and four assessors, has selected amongst the members thus chosen several who are also members of the Permanent Committee of the Office international.

"This will indicate how close are the relations between these two bodies. Collaboration is, moreover, made easier by the fact that the meetings of the two Committees are, as a matter of course, fixed as a result of agreement between the Presidents of the two Committees, and it may be anticipated that, unless unforeseen circumstances intervene, the meetings of the Health Committee will precede those of the Permanent Committee of the Office international.

"As it is in the interests of the two bodies to ensure ever-closer collaboration and to avoid duplication of work, the Permanent Committee of the Office will have before it, at its April session, an indication of the intentions of the Health Committee with regard to the programme of work it intends to carry out.

"An understanding could also be reached to the effect that the resolutions taken by the Health Committee at each of its sessions will immediately be brought to the notice of the Permenent Committee of the Office. Thus it will be possible for the latter body to draw up, without delay, if circumstances seem to require it, its observations with regard to the opportuneness and interest presented by the studies which the Health Committee proposes to undertake.

"It goes without saying that if new questions should arise between the April and the October session, and more especially if subjects for investigation are proposed by members of the Assembly, there would be no justification for putting them aside owing to the fact that the Permanent Committee of the Office had not been able to present its observations on those particular questions. Not only would this result in a regrettable delay of a year in the examination of these questions, but this line of argument as regards procedure would be opposed to the rights of the Committee and those of the Assembly. The agreement concluded with the Office international by the

League of Nations recognises, as a matter of fact, the Health Committee's express power of examining, without previous consultation with the Permanent Committee of the Office, any public health question concerning the League of Nations which may be submitted to it or initiated by the Health Committee itself (Section II of the Agreement ratified by the Assembly on September 15th, 1923).

"Moreover, important considerations may be urged in support of the transmission of the annual report of the Health Committee to the Permanent Committee of the Office at its ordinary session in October, since it is only then that the budget of the Health Organisation has been fixed by the Assembly and that it is possible to decide definitely as to what will be the questions with which the Health Organisation will deal in the course of the following year.

"In view of the fact that the annual reports will set out the questions which it is proposed to study and will indicate, subsequently, the progress or conclusion of the work undertaken, all the members of the Permanent Committee of the Office will have the opportunity, both frequently and as a matter of course, of making any observations which may seem to them desirable, and more especially, before any decision has been taken, of giving expression to their views as to the best methods that may be followed. Thus, satisfaction is given to the wish which seems to have moved the proposers of the original recommendation submitted to the Second Committee.

"In conclusion, it may be said that, whilst reserving the right of the Health Committee to examine all public health questions concerning the League of Nations which may be submitted to it or which the Committee itself may initiate, satisfaction will, as a matter of fact, be given to the Assembly's recommendation without it being necessary to change the date of transmission of the annual report which is to be forwarded by the Health Committee of the League of Nations to the Permanent Committee of the Office international d'Hygiène publique."

III.

The Health Committee adopted the report submitted by the Opium Commission appointed by the Provisional Health Committee. This report embodied the results of a supplementary investigation, undertaken at the request of the Advisory Committee on the Traffic in Opium and of the Preparatory Committee for the International Opium Conference, regarding the substantiation of the figures previously proposed by the Health Committee as representing the maximum legitimate consumption of opiates.

Subsequent enquiry has demonstrated how much justification there was for the recommendation made to the Opium Preparatory Committee — that is to say, that the quantity of 450 mg. of raw opium and 7 mg. of cocaine per head of population per annum could be regarded as representing the maximum legitimate needs in substances of this nature, so far as concerned European countries possessing a well-developed system of medical assistance.

The Health Committee proposes to invite the medical profession in the various countries to consider whether the therapeutic value of heroin is sufficiently great to compensate for the public dangers to which its abuse gives rise.

The Health Committee considers that the propaganda directed against the abuse of cocaine and morphine should reach only medical practitioners and students. Ill-considered propaganda would be likely to arouse morbid curiosity, and more harm than good would result.

Furthermore, the Committee thought that it would be desirable to consider whether preparations containing less than 0.2 per cent. of morphine and less than 0.1 per cent. of cocaine and heroin should not be equally subject to the control provided for in the Hague Opium Convention.

IV.

The Commission on Instruction in Public Health, which was set up by a resolution of the Health Committee at its first session, laid down the principles by which its labours are to be guided and presented a programme of work for the year 1925. The terms of reference of this Committee were defined by the Health Committee in the following resolution (dated February 20th, 1924):

> "The Health Committee decides to appoint a Sub-Committee to examine the documents already collected by the Health Section regarding instruction in health and social medicine in the different countries of Europe and of America, and in Japan;
>
> "To continue this enquiry, making its scope as large as necessary;
>
> "And to make recommendations in favour of courses of study which, in its opinion, are most likely to yield the highest value for public health education both from scientific and practical points of view."

The programme outlined for 1925 includes in particular the study of the instruction in public health for medical students and for medical specialists in European universities, and possibly also in those of the United States and of Canada.

V.

The Committee examined the resolution of the Fifth Assembly which entrusts to it the study of tuberculosis and instructs it to undertake an enquiry into the value of preventive measures against tuberculosis, taking into account the proposal presented by the Government of the Kingdom of the Serbs, Croats and Slovenes and the resolution of the International Union against tuberculosis inviting the Health Committee to study the problem of tuberculosis.

The Committee further considered a proposal brought forward by its Japanese member, relating on the one hand to the questions referred to in the resolution of the Assembly regarding the standardisation of tuberculin, and on the other hand to a comparative study of measures for the prevention and for the early treatment of tuberculosis.

The Committee decided to undertake the research on tuberculin, entrusting it to its Permanent Committee on the Standardisation of Sera, which will consider a plan of work and will secure the collaboration of Dr. TSURUMI and Professor Léon BERNARD.

As regards the enquiry into social measures against tuberculosis, the Committee decided to entrust to the Secretariat the task of drafting, for discussion at its April session, a preliminary report, which could serve as a basis upon which to frame a specific plan for an international enquiry into tuberculosis.

The officers of the Committee, including the Vice-Presidents who will complete their term of office on January 1st, and Dr. TSURUMI, will follow the preparatory work which is entrusted to the Secretariat.

VI.

Dr. MADSEN, President of the Committee, referred to the further progress achieved in serological and biological research. He stated that final agreement had already been reached regarding anti-diphtheritic serum; before the end of the year the same would apply to anti-tetanic serum, while work on anti-pneumococcic and anti-meningococcic sera was in progress.

In 1925, the research on the sero-diagnosis of syphilis would probably be concluded.

Very considerable progress had been made by the Conference of Specialists which examined the problem of the standardisation of anti-dysenteric serum at Geneva from September 24th to 27th, 1924. The difficulties, both theoretical and practical, which still stood in the way of the adoption of a standard serum had fortunately been overcome, and there was now nothing to prevent the employment of an international unit, the determination of which had been entrusted to the Danish State Serological Institute.

VII.

At its Conference held in London on September 4th, 1924, the Committee of Experts entrusted with the study of sleeping-sickness and tuberculosis in Equatorial Africa framed a series of recommendations to the Health Committee, suggesting that the latter should entrust to a special mission the study of certain epidemiological problems connected with sleeping-sickness in Africa.

After giving the matter the fullest consideration, the Committee decided to submit to the Council the following report in this connection:

"*Sleeping-Sickness.*

"The Committee makes the following recommendation to the Council:

"(*a*) *Administrative Measures.*— It would be desirable for the Governments of the infected countries to afford facilities for conferences between administrators and medical officers on both sides of the frontier in charge of the campaign against sleeping-sickness.

"There should be co-operation in order to ascertain what zones are affected, the prevalence of the tsetse fly, migrations and movements of the population, all factors favourable to the communication of the disease, etc.

"If, to effect this liaison, it would be desirable to convene a conference of the representatives of the various Governments the Health Committee would offer all possible assistance.

"Finally, the Committee ventures to draw the attention of Governments to the advantages in the struggle against sleeping-sickness which accrue from the presence of a medical service in proportion to the population of the areas to be supervised.

"(*b*) *Technical Investigations.* — The Committee of Experts has suggested that the following questions should be investigated:

"(1) The existence of any human immunity against trypanosomiasis, the nature of such immunity and the factors which determine it;
"(2) The comparative value from a curative and prophylactic point of view of trypanocidal agents, the resistance of trypanosomes to those agents and the methods by which such resistance may be modified;
"(3) The function of wild and domestic animals as breeding-grounds for the virus;
"(4) The relations between *Trypanosoma gambiense* and *Trypanosoma rhodesiense*;
"(5) The testing of precipitines applied to the blood in the alimentary canal of the tsetse fly."

The first two questions might be included in the research work of local laboratories and of the organisations against sleeping-sickness which exist in equatorial regions.

The remaining questions would involve protracted work which could be entrusted only to a special mission devoting itself exclusively to the extremely delicate and prolonged scientific research necessary on the subjects referred to.

For this mission to achieve its end, assistance from the administrations of the Governments concerned and adequate funds are necessary. An appeal might be made for this purpose to the League of Nations, to the local Governments and to the various institutions which are interested in the question.

If this recommendation is accepted, the Health Committee could submit to the Council a list of the members of this mission, after consulting the technical services of the various Governments and taking into account the suggestions of the Committee of Experts.

VIII.

The Committee approved the preliminary work carried out with a view to setting up at Singapore a branch of the Epidemiological Intelligence Service of the Health Section of the Secretariat of the League of Nations, and entrusted Dr. Norman WHITE with the task of representing the Health Organisation at the Governmental Conference which will meet at Singapore, on December 1st, to study the most practical and effective means of establishing that office.

As regards the draft Health Convention for the Far East, as the Committee has received, up to the present, only a few replies from the Governments of those countries, it decided to await observations from the other Governments concerned before expressing its opinion.

IX.

The Health Committee, as the result of enquiries prompted by a proposal emanating from the Dutch Government, intends to frame model clauses of an agreement of the kind described in Article 41 of the International Sanitary Convention of Paris, having as their object the avoidance of the needless repetition of sanitary measures applied to ships in accordance with the terms of that Convention.

The Committee considers that the proposals put forward by the Brazilian member of the Committee regarding international maritime sanitary inspectors call for full and careful consideration in all countries where conditions render practicable the employment of such a measure.

The Health Committee has decided to avail itself of the collaboration which the Sub-Committee for Ports and Maritime Navigation of the Advisory and Technical Committee for Communications and Transit has offered, when the consideration of the questions of interest to both organisations is a little further advanced.

X.

Following a meeting of the League of Nations and International Labour Office Mixed Committee for the investigation of disinfection processes for hides and skins suspected of being infected with anthrax, the Mixed Committee submitted a report which was adopted by the Health Committee. The conclusions of this report are as follows:

1. The members of the Mixed Committee will collect information in their respective countries concerning the existence and, where possible, the value of toxic gases as potential disinfectants against anthrax spores.

2. M. OTTOLENGHI for Italy, M. NOCHT for Germany, and Mr. COLLIS for Great Britain will direct investigations into the comparative value of the methods of disinfection based respectively on washing soda and on hydrochloric acid. Mr. Collis will also collect supplementary information concerning raw materials treated in his country by the Seymour-Jones process.

3. It is now possible to proceed to the formation of National Committees in the following countries: Germany, Belgium, France, Great Britain, Italy, and perhaps the United States and Switzerland. For this purpose, it will be the duty of the International Labour Office to get into touch with the organisations concerned, with a view to ensuring their collaboration with the Mixed Committee. The work of the National Committees will be to carry out such experiments as will demonstrate the technical and economic value of the methods under consideration.

These conclusions obtained unanimous approval.

XI.

The Sub-Committee on Waterways reached the following conclusions, which were approved by the Committee:

The model Convention drawn up by the Sub-Committee will be referred to the *Office international d'hygiène publique*, which will be requested to examine it with a view to its transmission to Governments. The Office international will, at the same time, be informed of the circumstances in which the proposal was framed and, in particular, that it is the outcome of collaboration between the Health Committee and another technical organisation of the League of Nations, namely the Advisory and Technical Committee for Communications and Transit; so that, should any modifications appear desirable, it would seem necessary to subject the proposal to further discussion by both these organisations.

The Office international would at the same time be informed that, should certain Governments wish to proceed to the conclusion of special agreements based on the model Convention, and should such Governments consider that investigations of a technical nature might still be requisite in order to adapt the draft model Convention to their special needs, the Health Committee would willingly place itself at their disposal.

XII.

Cancer Commission.

The special object of the enquiry now being undertaken is to elucidate the factors responsible for the divergent rates of mortality attributed to cancer of the breast and uterus in Great Britain Holland and Italy respectively. The enquiry has not progressed sufficiently in all three countries to permit of judgments or comparisons being made, but interesting data have been accumulated.

The demographic part of the enquiry is being devoted to a comparison of the influence of age distribution, civil status, fecundity and other factors, in the three countries, in the causation of the disease.

The comparison of facts concerning operative treatment of cancer in the three countries is progressing. It has been ascertained that in England and Wales, about one-third of the fatal cases of cancer of the breast had not been submitted to operative treatment and that in the remaining cases it would appear that the average period of time which elapsed between the discovery of the cancerous condition and the operation was undesirably long. It is hoped that the corresponding facts for Holland and Italy will be obtainable for comparison.

Hospital enquiries in all three countries are making good progress. The special points being studied are the importance of such factors as antecedent injury, mastitis, lactation, labour and pregnancy, age, race, etc., on the production of the disease.

The observation that, in the United States of America, cancer mortality among women whose mothers were Italian is very much lower than that among women with British mothers is of extreme interest to the present enquiry as these data coincide with those afforded by the statistics (of the three countries) which have served as a starting-point for the enquiry.

The Health Committee has decided to invite members of that Committee and of the Office international d'hygiène publique to suggest the name of a cancer correspondent in each country who would undertake voluntarily to send to the Health Organisation of the League of Nations information regarding researches or new publications of interest to the prosecution of the cancer enquiry.

XIII.

The International Conference on Emigration and Immigration, which was held in Rome in May last, having decided to transmit the resolutions adopted in the course of its deliberations to the competent international organisations, the Secretary-General forwarded to the Health Committee a collection of the decisions of that Conference. The Committee decided to take cognisance of these documents, to invite its members to study them, and to place the examination of these resolutions on the agenda of its April session.

XIV.

The Malaria Commission submitted a provisional general report bearing on the collective tour of enquiry undertaken by several of its members, accompanied by the corresponding members of the Commission in the Kingdom of the Serbs, Croats and Slovenes, Greece, Bulgaria, Roumania, Russia and Italy. The investigations carried out on the spot by the Commission aroused very considerable interest on the part of the health administrations of the countries visited, one of which has applied to the Commission for an advisory opinion.

The Malaria Commission proposes to prepare, before the end of the year, a final report, which will give an analysis of the problem of malaria considered fully in all its aspects. The report will deal in succession with:

(*a*) An analysis of the incidence of different forms of malaria in Eastern Europe, including a critical examination of the statistical and demographic data on which the general conclusions are based;

(*b*) The endemic character of the disease from the social, demographic and clinical points of view;

(*c*) General epidemiology of malaria in the countries visited;

(*d*) The organisation of the campaign against malaria;

(*e*) The fight against mosquitoes;

(*f*) The improvement of the sanitary condition of the soil and of the population;

(*g*) Finally, general conclusions and recommendations.

These chapters will be followed by separate reports dealing with each of the countries visited.

The Committee also examined the first reports on the quinine problem which were submitted by some of the experts consulted on the subject by the Commission. It decided to recommend that treatment by means of the different quinquina alkaloids should be tried in various malaria-infested regions under the direction of competent persons.

In this connection, it adopted the following resolution:

"The Health Committee:

"Decides to entrust to medical men in charge of hospitals, of medical clinics and of anti-malaria ambulances stationed in malarial regions in Algeria, Spain, Italy and Roumania, and in the Kingdom of the Serbs, Croats and Slovenes, and having under treatment numerous patients presenting the different forms of malaria, the investigation on a large scale of the therapeutic value of cinchonine, other secondary alkaloids of quinquina and preparations of the total alkaloids, the investigation to be carried out fully, methodically and over a sufficient period of time.

"The Malaria Commission is charged with the preparation of an exact programme for this work and with considering the possibility of furnishing the different therapeutic agents for the investigation, with a view to the latter being carried out uniformly."

The Committee decided that collective enquiries on the spot by the Malaria Commission should be continued next year, and, in that connection, it adopted the following resolution:

"The Health Committee:

"Decides to charge the secretariat of the Health Section with the duty of organising, so far as budgetary considerations will allow as a programme of work for 1925:

"(*a*) A study tour of members, experts and correspondents of the Malaria Commission in Sicily, Tunis, Algeria and Morocco in the early spring of 1925.

"(*b*) A second voyage in Spain and Portugal during August and September, or September and October 1925; the duration of each voyage not to surpass six weeks."

The Health Committee also examined the preliminary report submitted by the two investigators sent to make enquiries in Albania and Persia at the request of the Governments of those countries.

The Council of the League of Nations transmitted to the Health Committee, for its technical opinion, a letter from the League of Red Cross Societies, accompanied by a report by Dr. A. GAUTHIER dealing with the health conditions prevailing among the Greek and Turkish populations exchanged under the Treaty of Lausanne. This letter and report call attention to the mortality and to the prevalence of disease among these refugees, and put before the League proposals for the provision of sanitary equipment to the value of £350,000 for Greece and £150,000 for the Turks, or £500,000 in all. As this figure was extremely high, the League of Red Cross Societies felt that it must appeal for international assistance.

The Health Committee has also received two reports on the position in Greece from the point of view of health: one from Dr. Norman WHITE, who was sent by the Health Committee, at the request of the Greek Government, to examine the situation, and the other from Professor PITTALUGA, on behalf of the Malaria Commission, which has just visited the same region. After considering all these documents, the Health Committee reached the following conclusions:

I. It is undeniable that the present condition of the populations that have been exchanged is far from satisfactory. This is an accepted fact, despite the lack of reliable statistical data.

II. Malaria has assumed, in Greek Macedonia more particularly, and in other regions where this disease is endemic, an epidemic and virulent character, thus adding to the distress of the populations and lowering their powers of resistance to diseases of all kinds.

III. Infantile mortality and tuberculosis, which have assumed unusual proportions, bear witness to the wretched general conditions and the unsatisfactory economic circumstances in which these people are doomed to live.

IV. The almost entire absence of acute diseases in the form of epidemics bears witness to the very useful work which has been done by an improvised organisation under trying and painful conditions.

V. Improvement in the sanitary situation is entirely dependent on the improvement of economic conditions. Such improvement will inevitably result from the settlement of the refugees and their complete absorption in the rest of the population, but this result would be greatly facilitated and many lives might be saved were it possible to provide more up-to-date health organisation and personnel better adapted to the task in hand.

VI. The development and improvement of the present Health Service, with improved equipment and qualified technical experts, are a vital necessity for Greece at the present time. For this purpose, a practical school of hygiene for the purpose of training a staff that would be thoroughly competent in questions of prophylaxis and epidemiology would be of great assistance.

It is highly desirable that the Greek Government make sufficient provision in its budget for this public health organisation.

The refugees will be unable to draw full value from the land placed at their disposal, and to earn a livelihood for themselves and their families by means of their various occupations if they remain underfed, sick, cachectic, and tuberculous. It is urgently necessary to improve their environment.

"The Health Committee recommends:

"That the above conclusions be transmitted to the Greek Government and a copy be communicated to the Refugee Settlement Commission, with the suggestion that the Commission consult with the Greek Government as to the most suitable practical measures to be taken by that Government for improving general sanitary conditions;

"That, should the Greek Government so request, the Council of the League of Nations authorise the nomination of an expert of the League's Health Organisation, who would be placed at the disposal of the Greek Government for the purpose of giving technical advice in the improvement of the sanitary organisation in process of development, as well as assisting in the consultations between that Government and the Refugee Settlement Commission."

The Committee considers that the proposals transmitted by the League of Red Cross Societies represent a programme to cover a long period, rather than a scheme of urgent work to be undertaken forthwith. The numerous hospitals and organisations asked for are doubtless necessary, but, apart from the very great expenditure involved in building and installation, the time required for construction, the difficulty of obtaining a qualified staff, and the funds necessary for upkeep have all to be considered.

Without ignoring the public health side of the question, which is undoubtedly of great importance, primary consideration should perhaps be given to its economic and social aspect, and to the rapid completion of the settlement of the refugees under better conditions; the establishment of hospitals, crèches, sanitoria, and homes for the insane and incurables will be sure to follow.

The Health Committee has not sufficient information at its disposal to give an opinion on that part of the proposals which relate to health conditions in Turkey.

XV.

The Committee, in giving its approval to the report of the Medical Director on the work accomplished by the Health Organisation since the May session of the Committee, particularly as regards the system of interchanges of health personnel, decided to consider the organisation, in 1925, of an interchange specially devoted to public health offices of the Latin-American Republics; the Health Organisation would grant ten such health officials, nominated by their administrations, all facilities for studying the organisation and practice of the public health services in the United States, Canada, Great Britain and two or three countries of Continental Europe.

XVI.

The Health Committee, having noted the following resolution of the Assembly:

"The Assembly requests the Health Organisation to take into consideration in due course the study of the problem of physical education and to investigate means for its general extension on rational principles,"

decided to entrust the preliminary examination of this problem to the Committee on Instruction in Public Health, which will carry out this examination concurrently with the other enquiries in which it is engaged.

XVII.

After a discussion on the subject of the protection of children, the Committee adopted the following resolution:

"The Health Committee:

"Having noted the resolutions adopted by the Assembly with regard to the protection of children — and more especially numbers 4 and 5 of these resolutions — considers it to be its duty to point out to the Council that health matters occupy a prominent, or even essential, place in most of these questions, in which the Health Committee cannot but be interested;

"And expresses the hope that, in order to avoid overlapping, the Health Organisation should be represented on the Advisory Commission which will be reconstituted in accordance with the Assembly resolution; the form and extent of such representation being fixed by the Council."

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LEAGUE OF NATIONS

GENEVA,
October 8th, 1924.

MODEL CONVENTION FOR THE HEALTH SUPERVISION OF TRAFFIC OVER NAVIGABLE WATERWAYS.

ADOPTED BY THE MIXED SUB-COMMITTEE OF THE COMMITTEE FOR COMMUNICATIONS AND TRANSIT AND THE HEALTH COMMITTEE.

PART I.

CHAPTER I. — GENERAL PROVISIONS.

Article 1. — The High Contracting Parties undertake to apply the regulations of the present Convention to all traffic over the navigable waterways enumerated below.

The navigable waterways to which the present Convention shall apply are :

. . . . . .

Article 2. — The High Contracting Parties shall endeavour, in applying the regulations of the present Convention, to reconcile the needs of health supervision with the interests of commerce by reducing to a minimum any obstacles which may be placed in the way of free navigation.

CHAPTER II. — SUPERVISORY ORGANISATIONS. HEALTH ARRANGEMENTS. NOTIFICATION OF DISEASE.

Section I. — Supervisory Organisations.

Article 3. — The health supervision on navigable waterways forming the object of the present Convention shall be exercised by each of the High Contracting Parties within its own territory through its own Public Health Department.

In cases where an international body duly qualified from the sanitary point of view has been or is to be established over these waterways, this body may provide for the execution of the measures laid down in the present Convention.

Article 4. — Subject to paragraph 2 of Article 3, the representatives of the Public Health Departments of the States concerned shall meet at least once a year at a place to be selected by common agreement on each occasion, in order :

(*a*) to preserve the necessary co-ordination and unity of action ;
(*b*) to ensure the smooth working of the health service.

Section II. — Exchange of Health Information.

Article 5. — The High Contracting Parties undertake to communicate directly to each other through their respective Public Health Departments all useful information as to the health conditions in their respective countries ; these communications shall be made in a regular and periodical manner.

Section III. — Notification of Cases of Cholera, Plague, Typhus, Relapsing Fever, Dysentery, Smallpox and Influenza.

Article 6. — In addition to the communications mentioned in Article 5, the High Contracting Parties undertake reciprocally to give immediate notice of :

(*a*) the first appearance of plague or cholera certified in the territory of each of the States concerned ;

(*b*) any epidemic centres of typhus, relapsing fever, dysentery or smallpox in their respective territories ;

(*c*) any appearance of influenza of an epidemic character.

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Article 7. — The notification referred to in the preceding article shall include circumstantial details, more especially regarding the following points :

1. The places at which the disease appeared ;
2. The date of the appearance and clinical form of the disease ;
3. The number of cases established ;
4. In the case of plague, whether there is an abnormal mortality among rats ;
5. What immediate measures have been taken.

Article 8. — The notifications and exchange of information provided for in Articles 6 and 7 should be followed at regular intervals by further communications.

PART II. — ORGANISATION OF PREVENTIVE HEALTH MEASURES AND SUPERVISION.

Chapter I. — Vessels.

Article 9. — It is desirable that vessels should be provided with :

(*a*) arrangements to ensure cleanliness on board ;

(*b*) 1. drinking-water tanks of sufficient size, which can be kept free from all contamination, and which are fitted with suitable appliances for distribution ; 2. latrines with portable or fixed receptacles in which excrements can be disinfected before they are emptied ;

(*c*) a sufficient supply of disinfectants (as indicated in Appendix 1).

Article 10. — It is desirable that instruction should be given to the crews of vessels and rafts on the important part played by navigable waterways in the propagation of infectious diseases. This instruction should be given :

(*a*) by elementary courses explaining the rudiments of hygiene (particularly the danger of drinking the water of navigable waterways), the most characteristic symptoms of the principal infectious diseases and the prophylactic measures to be taken against them ;

(*b*) by distributing booklets and leaflets containing instructions and advice regarding precautions to be taken by individuals against infectious diseases.

Chapter II. — Health and other Prophylactic Establishments.

Article 11.— The High Contracting Parties undertake to provide immediately, while conditions are normal, for the organisation of special health stations along the navigable waterways which are the subject of the present Convention.

It is desirable that, while conditions are normal, joint health stations should be organised at the frontiers and that, in the case of navigable waterways which form frontiers, the distribution of inspection stations should be decided upon by common agreement.

Such health stations :

(*a*) shall be provided with a specially trained staff (medical and subordinate) and with prophylactic appliances proportionate to the volume of traffic ;

(*b*) shall be placed along the navigable waterways at suitable intervals. It is desirable that vessels should be inspected at least once in every twenty-four hours.

Article 12. — The existence of health stations shall be shown by the following signs set up in such a way as to attract attention :

(*a*) notices with the inscription : "Health Inspection Station" ;

(*b*) by day a yellow flag, and by night two lights, one [colour], and the other [colour], both at the same distance above the ground.

Article 13. — Health stations of all degrees of importance shall be supplied with :

1. An inspection room ;
2. A shower-bath room.

They shall also contain :

1. Disinfection and delousing rooms ;
2. A temporary or permanent isolation ward for persons suffering from infectious diseases, unless they are in easy communication with similar services.

Every health station should be in touch with a bacteriological laboratory.

Health stations shall further be supplied with :

(*a*) drinking water for renewing the supplies of vessels ;
(*b*) boxes for the transport of samples of drinking water ;
(*c*) boxes for the transport of pathological material ;
(*d*) disinfectants ;
(*e*) appliances for destroying rats.

There should also be attached to every health station a pit in which excrements and bilge-water from vessels calling at the health station may be deposited and destroyed or rendered innocuous.

Article 14. — The High Contracting Parties undertake to provide, at convenient intervals, stations for the supply of drinking water to vessels.

The location of these stations shall be indicated by the following signs so set up as to attract attention :

(*a*) notices with the inscription : " Supply of drinking water " ;

(*b*) by day, a [colour] flag, and by night two lights, one [colour] and the other [colour], both at the same distance above the ground.

Article 15. — Each of the High Contracting Parties shall have a special map provided for the navigable waterways or parts of navigable waterways forming the subject of the present Convention. These maps shall show health supervision stations, disinfection stations, isolation hospitals for persons suffering from infectious diseases, bacteriological laboratories for the use of health stations, stations for the supply of drinking water, etc.

These maps shall be transmitted by each State to the other signatory States.

PART III. METHOD OF WORKING.

Chapter I. — General Provisions.

Article 16. — The High Contracting Parties undertake to take the necessary measures, even in normal times :

(*a*) for vessels to be cleared of rats at least every six months ;

(*b*) for the periodical disinfection of bilge-water.

Article 17. — As soon as non-imported cases of plague or cholera appear, or the existence of epidemic centres of typhus, relapsing fever, dysentery or smallpox is established, in the basin of any of the navigable waterways forming the subject of the present Convention, the competent Health Authority shall forthwith establish health supervision on navigation in the sector or sectors affected.

The High Contracting Parties undertake to notify one another immediately of any sector or sectors in which they have established health supervision.

Article 18. — In conformity with Articles 5, 6 and 7, the High Contracting Parties undertake not to consider a sector as infected or to declare a sector infected when it is situated in the territory of another Contracting State unless the latter should make a formal declaration to that effect.

Article 19. — The object of the steps to be taken ashore in infected sectors shall be :

(*a*) to prevent the embarkation of persons showing symptoms of any of the infectious diseases mentioned in Article 6 and of individuals in the immediate company of such sick persons if those individuals may reasonably be regarded as capable of transmitting the disease ;

(*b*) to prevent the exportation of goods or any other objects which may be regarded as infected, in accordance with the International Health Conventions in force, and which have not previously been disinfected ashore under the supervision of the medical officer appointed by the Public Health Authorities ;

(*c*) in case of plague to prevent rats from going on board or ashore.

Preventive vaccination is recommended in the case of passengers, crews, all persons employed in health supervision, and all officials and employees whose duties bring them into direct contact with the vessels or their crews.

Article 20. — The object of the steps to be taken on board vessels in affected sectors should be :

(*a*) to investigate the state of health of persons on board (passengers and crew) ;

(*b*) to isolate persons suffering from any of the infectious diseases referred to in the present Convention ;

(*c*) to place contacts under medical observation, in accordance with the provisions of the International Health Conventions ;

(*d*) to place under medical observation other persons disembarking who may be indicated to the competent authorities of the place of destination ;

(*e*) to enforce the execution of the provisions of Article 9 ;

(*f*) to carry out disinfection, destruction of rats and vermin.

Article 21. — A health certificate on the model given in Appendix 2 shall be delivered to all persons liable to any of the sanitary measures provided by the present Convention who may apply for it. This certificate shall be duly filled in or completed by the Health Authority or Authorities which shall have applied the same measures.

This certificate shall be compulsory for all persons placed under medical observation and shall be valid as a medical passport in countries where such a passport is required.

Article 22. — As soon as the sanitary supervision is put into force, every vessel coming from affected sectors shall be furnished by the nearest health station with a bill of health on the model given in Appendix 3, unless it is already provided with one. The bill of health shall include a record of all observations regarding the hygienic condition of the vessel and shall indicate the health measures to which it has been subjected.

Article 23. — The expenses occasioned by sanitary supervision shall be borne by the States concerned. Any taxes which may be imposed in this respect on navigation must be kept within reasonable limits.

Chapter II. — Special Provisions.

A. *Cholera.*

Article 24. — If there are persons on board showing symptoms of cholera, the following special steps shall be taken :

(*a*) The vessel shall be isolated. This isolation shall cease only when the measures contained in (*b*), (*c*) and (*f*) shall have been carried out.

(*b*) Any persons infected or suspected of being infected shall be immediately disembarked and isolated.

(*c*) Persons who are suspected of having been exposed to infection on board shall be placed under medical observation during a period of five days. The Health Authorities shall, in consideration of the state of the vessel and of local conditions, determine whether the medical observation is to be carried out on board or on shore.

(*d*) All other persons shall be placed under medical observat on during a period of five days reckoned from the moment when the various prophylactic measures were taken.

(*e*) Bacteriological examinations shall be conducted as far as may be considered necessary, provided that the period of five days is not exceeded.

(*f*) Any parts of the vessel and any objects which may be considered to be contaminated shall be disinfected.

Article 25. — If there are no persons showing symptoms of cholera on board a vessel coming from an affected sector, all persons disembarking from this vessel shall nevertheless be kept under medical observation during a period of five days, reckoned from the date the vessel sailed from the last port at which it called in the affected sector.

B. *Plague.*

Article 26. — If any persons on board show symptoms of plague, the following special steps shall be taken :

(*a*) The vessel shall be isolated. Such isolation shall continue until the measures referred to in (*b*), (*c*), (*e*) and (*f*) have been carried out.

(*b*) Any persons infected or suspected of being infected shall immediately be disembarked and isolated.

(*c*) Persons who may be considered to have been exposed to infection on board shall be placed under medical observation for five days. The Public Health Authority shall determine whether such medical observation shall be carried out ashore or on board, having due regard to the conditions on board the vessel and local facilities.

(*d*) All other persons shall be placed under medical observation for five days, reckoned from the time at which the various prophylactic measures were carried out ;

(*e*) All rats on the vessel shall be destroyed. The Public Health Authority shall determine whether the operation is to be carried out before or after the unloading of the cargo.

(*f*) Parts of the vessel and objects which may be considered to be contaminated shall be disinfected.

Article 27. — Even if no person showing symptoms of plague is discovered on a vessel coming from a plague area, all persons disembarking from the vessel shall be placed under medical observation for a period of five days, calculated from the time at which the vessel left its last port of call in the affected area.

In the event of an abnormal mortality occurring among the rats on board, the measures prescribed in paragraphs (*d*), (*e*) and (*f*) of Article 26 shall be carried out.

C. *Typhus and Relapsing Fever.*

Article 28. — If any persons on board show symptoms of typhus or relapsing fever, the following special steps shall be taken :

(*a*) The vessel shall be isolated. Such isolation shall continue until the measures referred to in (*b*), (*c*) and (*d*) have been carried out.

(*b*) Persons who are infected or suspected of being infected shall be immediately disembarked, deloused and isolated.

(*c*) Persons who may be considered to have been exposed to infection on board, including persons who are not in a satisfactory condition from the point of view of hygiene, shall be deloused and placed under medical observation for 12 days reckoned from the date of disembarkation.

(*d*) Any parts of the vessel and any objects which may be considered to be contaminated shall be subjected to disinfection and disinsectisation.

E. *Dysentery.*

Article 29. — If any persons on board show symptoms of dysentery, the special measures referred to in (*b*) and (*c*) of Article 24 shall be applied.

F. *Smallpox.*

Article 30. — If any persons on board display symptoms of smallpox, the following special measures shall be taken :

(*a*) The vessel shall be isolated. Such isolation shall continue until the special measures referred to in (*b*), (*c*) and (*d*) shall have been carried out.

(*b*) Persons who are infected or suspected of being infected shall be immediately disembarked and isolated.

(*c*) Persons who may be considered to have been exposed to infection on board and who, in the opinion of the health authorities, are not adequately protected by recent vaccination or by a previous attack of smallpox may be required to undergo vaccination or may be placed under medical observation for a period of 14 days reckoned from the date of disembarkation.

(*d*) Any parts of the vessel and any objects which may be considered to be contaminated shall be disinfected.

PART IV. — GENERAL PROVISIONS.

Article 31. — All information which must, in conformity with Articles 5, 6, 7, 8 and 15, be communicated by each High Contracting Party to the other signatories shall be transmitted simultaneously to the Health Section of the League of Nations.

The Public Health Departments of the High Contracting Parties shall also transmit to the Health Section of the League of Nations at the end of each year a report concerning the working of the Health Supervision Organisation for the various navigable waterways referred to in the present Convention.

Article 32. — The High Contracting Parties undertake to submit any disputes which may arise between them concerning the interpretation or application of the present Convention for an advisory opinion to a mixed organisation of representatives of the League of Nations Health Committee and the League of Nations Advisory and Technical Committee for Communications and Transit before submitting them to any judicial body.

Appendix 1.

List of Disinfectants with which Vessels must be provided.

1. Quicklime.
2. Cresol.

N.B. — The amount of each of the disinfectants referred to shall be fixed by the Public Health Authorities concerned. Such amount must, in any case, be sufficient for all requirements for at least 48 hours.

It is understood that the object of prescribing the above disinfectants is not to prohibit the use of any other disinfectant the value of which is more highly esteemed by the signatory States.

Appendix 2.

Health Certificate to be delivered to every Person disembarking (Crew or Passengers).

Sanitary Station at .....

I, the undersigned, Medical Officer of Health, declare that Mr .....

..... travelling on .....

who has arrived on the ..... of .....

and has stated that he is proceeding to .....

* has been isolated for ..... days.

* has been placed under medical observation for .....days.

* has been vaccinated against ..... on .....

* has had his baggage { disinfected on ..... / disinsectised on..... }

* will be required to remain under medical observation for.....days.

Date..... (*Signed*) .....

Medical Officer in charge of the Sanitary Station.

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* Cross out any portion which is inapplicable to the case.

Appendix 3.

BILL OF HEALTH.

[*First page of the Booklet.*]

Country .....

Bill of Health No. ..... for the Health Supervision of International Traffic on Inland Waterways.

Class of vessel * ..... flying ..... flag.

Name.....

Distinctive marks (letters, etc.).....

Number.....

Tonnage.....

Owned by ..... domiciled at .....

Name of master ..... resident at .....

Waterways used by the vessel .....

.....

.....

.....

Remarks (if any) .....

Issued at ..... on ..... (date).

Master of vessel :

.....

Authority by whom the Bill of Health is issued :

.....

* Indicate whether steamer, tug, tartan, large or small boat, motor-boat, etc.

[*Back of the Booklet.*]

Latrines
- (*a*) Portable
  - Number.....
  - System.....
  - Position.....
- (*b*) Fixed
  - Number.....
  - System.....
  - Position.....

Tanks for drinking water
- Number.....
- Capacity.....
- System and materials employed in construction.....
- System of distribution.....

Disinfectants with which the vessel is provided
- Quicklime ..... kilos.
- Cresol ..... litres

Protective appliances with which the vessel is provided against rats
- System.....
- Number.....

Rat-traps with which the vessel is provided
- System.....
- Number.....

Seen on.....

[*Leaf of the Booklet.*]

Series No. .....

Inspection No. .....

Health Supervision Station at .....

Waterway .....

Number of persons on board .....

Last port of call .....

Next port of call .....

Sanitary measures applied by the Health Stations, and remarks (if any) .....

.....

.....

.....

The next inspection will take place at the Health Station at .....

.....

Medical Officer in charge of the Sanitary Station.

(date) .....

UNIVERSITY OF ILLINOIS-URBANA
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